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MARCH 195

Flight Operations

Round Table: Problems

n Parts Distribution

Flight Evaluation: Convair 340

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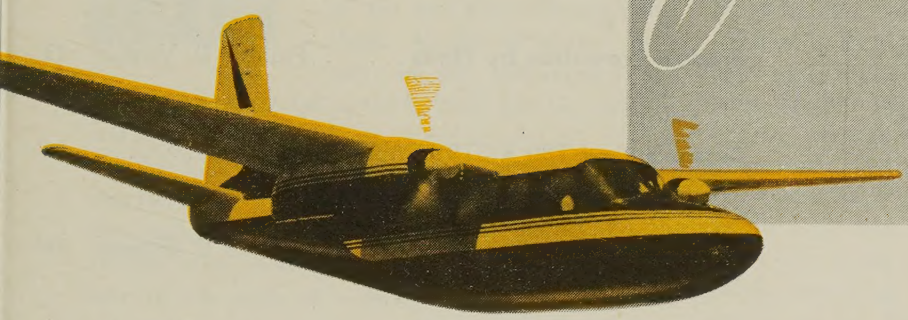

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MARCH 1953

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COVER: Convair 340 is newest high-speed air transport now in scheduled airline operation with United, Braniff, American, C&S.

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in this issue..

Capt. L. Homer Mouden, author of the evaluation report on the Convair 340, is a former Mid-Continent Airlines pilot, now a Braniff Captain since the recent merger of the two lines. Throughout Capt. Mouden's airline career, he has participated in safety and engineering work, both for his airline and for the Air Line Pilots Association. Capt. Mouden was a member of the pilot committee that ALPA sent to San Diego to study and evaluate the new 340, now going into extensive service with the scheduled airlines. The photo (page 12) of the single-engine take-off was made on a flight with the ALPA pilot committee aboard and, on that particular flight, Capt. Mouden occupied the copilot's seat.

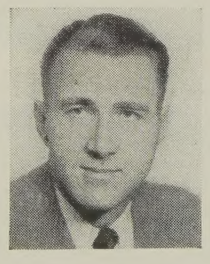
Born in Nebraska, Capt. Mouden began flying in the Spring of 1938 when he was studying for his Master's Degree in Science and Mathematics at Iowa State College. After completing his Master's Degree (in 1939), he stayed on at Iowa as a member of its staff until 1941 when he left to join Mid-Continent Airlines. He checked out as a Captain a year and a half later.

Watch for more of Capt. Mouden's articles in *Skyways*. We join with other pilot personnel in considering Capt. Mouden a most able specialist in the field of aviation safety and engineering as it applies to flight operations.

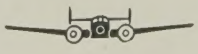
▶ All work and no play makes jack . . . unless you're another Capt. Hy Sheridan who has the knack of making jack out of both. At any rate, we welcome Hy to *Skyways* and, in addition to his sometimes tempestuous and always teasing topics that you'll find scattered throughout the magazine, we offer his article "Low Down on the Let-Down," or "How to Keep the ILS from Throwing You." After reading several (understatement) pages of material sent us by the spirited Sheridan, we were anxious to find out something about his background. He got off it long enough to send in a "short" biography:

"I was born (hearsay) too many years ago. Upon that occasion, Ma looked at Pa; Pa shrugged. I am an only child. I got my first flying in a Wright Model B. I sat on the leading edge of the wing. There were no instruments, but a fellow could find out the condition of the engine by using the convertible technique—you just reached over and put your hand on it. If you got a blister, you poured in some more oil. I did not have a formal education, having been the informal, learn-through-my-own-mistakes (plenty) type all my life. I became an airplane pilot in the early days when the swiveled gentry had not yet found out from us what to tell us to do. For awhile I got into the bad habit of getting married, but I was finally able to taper off. I have another hobby: inventing. I invented the first proximity fuse (mine was for depth charges, not artillery shells) and conducting housings for radio loops and ferrous shielding. And I write some, too. That about brings me up to the present, which is where I like to be."

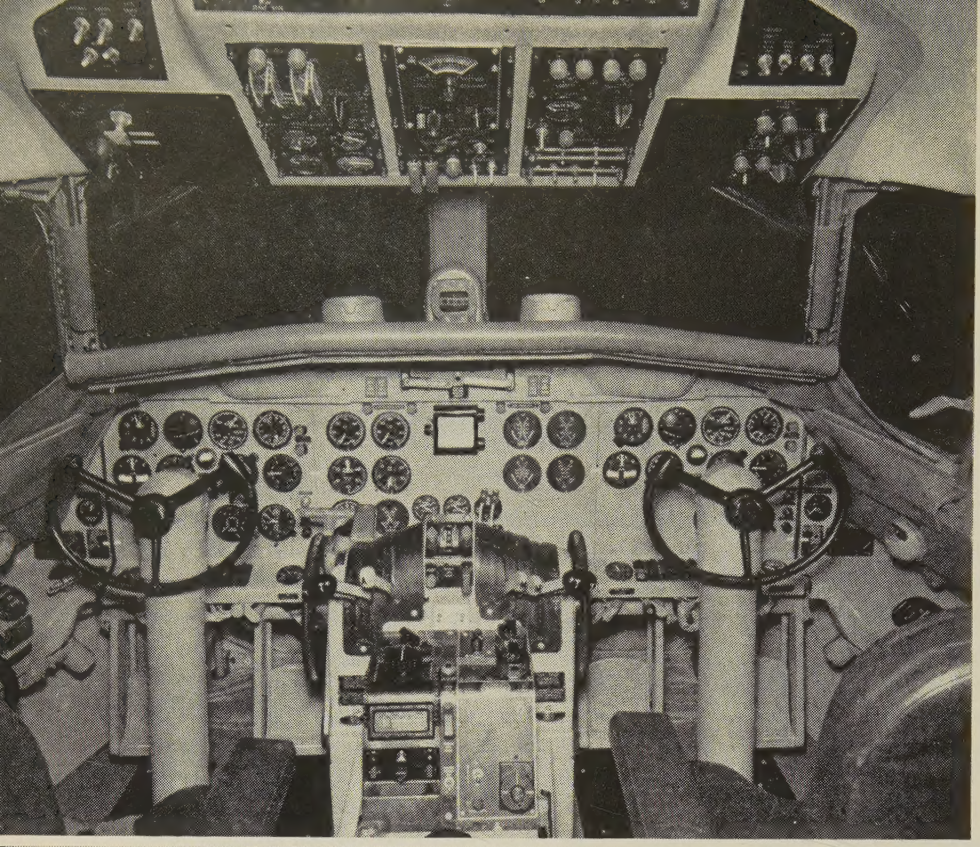
With this expurgated edition of Capt. Sheridan's biography, we welcome him to *Skyways*. The guy knows what he's talking about . . . and has a lot of fun telling it.



Leonard J. Lee, Chief of Maintenance, Air Transport Dept., of Continental Can Co., details his company's aircraft maintenance operation in the article, "Planned Maintenance." Mr. Lee spent two years as a mechanic with TWA, and left in 1943 to become a flight engineer for Convair. In the Air Force (China-Burma-India theatre) during the war, Mr. Lee joined Continental Can Co. with Steve Brown, Chief Pilot, in the early Fall of 1945.



▶ Next Issue: The Flight Operations Round Table for April will be on the subject of radar control, with pilots and Flight Operations men participating.



FLIGHT DECK *photo of Convair 340 shows arrangement of instruments, controls. Cockpit is roomy, visibility is good*

CONVAIR 340's *are now in scheduled operations for Braniff and United Air Lines. Average range is 1200 miles*

evaluation report

CONVAIR 340

by Capt. L. Homer Mouden

Braniff Airways

Do you remember when, as a boy, you thumped the watermelon in the patch and attempted to decide how good it would be before it could be given the real test—the "taste test"? That's rather the situation in which this writer finds himself when requested by your editor to write an operational evaluation of Consolidated Vultee's newest transport, the Convair 340. The 340 has not at this writing been given the real test—use in scheduled airline operations for a period of time.

The author was one of a group of airline pilots who were invited to observe the assembly of the new 340 in the San Diego factory, and who were given the opportunity to inspect, fly, and attempt to evaluate the Convair 340 which is now coming off the production lines for delivery to various operators. During the week at the factory, an attempt was made to absorb as much information as possible concerning the design, the engineering, and the flight characteristics of the new airplane. The amount of information obtained was considerable—both as to the design and the construction of the aircraft itself, and as to its performance during the various flight tests. However, people in the airline industry have long recognized that the only thorough test and evaluation of a new or refined aircraft comes through scheduled day-after-day usage. Thus, this evaluation of the operational characteristics of the 340 is—like the watermelon—awaiting the true test. The writer wishes each reader to bear in mind that the opinions expressed herein were formed during factory tests, and not from actual airline operation. Braniff Airways has one airplane on schedule, and United Air Lines is anticipating use of the 340 in scheduled operations early in 1953.

The Convair 340 is a low-wing, twin-engine transport. The fuselage is cylindrical in construction for maximum structural strength and pressurized operation. The wing span is 150 ft. 4 ins.; the length is 79 ft. 2 ins., with a fuselage diameter of 9 ft. 5 ins. The height of the tail is 28 ft. 2 in.; the tread of the main wheels is 25 ft. The gross weight of the basic 340 is 47,000 lbs., with an empty weight of 28,850 lbs., giving a use-

ASSEMBLY LINE *at Convair's San Diego plant shows several of the pressurized 44-passenger Convair 340's nearing completion*

SINGLE-ENGINE *take-off at maximum gross weight of 47,000 pounds was demonstrated to a committee, including author, of ALPA. Tests proved the 340 with 44 passengers, baggage can easily continue to climb in event of engine failure*

ful load of 18,150 lbs. including passenger, crew, cargo, and fuel. The manufacturer claims an average cruising airspeed of 284 mph at 20,000 ft. with 1200 BHP/Eng at 45,000 lbs. It would appear that when loaded with the various appendages of the individual operators, and as used in scheduled service, the 340 will operate much closer to a normal-haul, block-to-block speed of around 200 mph. From having flown both the 340 and its predecessor, the 240, the 340 seems to be about 7 to 8 mph slower than the 240. This, however, is probably a credit to the new model. Engineers have never achieved "something for nothing." The added three tons of weight, 13 feet of wing span, and four and one half feet extra fuselage length cannot be hauled around at the same speed, with the same power. The operators undoubtedly will use about 150 to 200 BHP/Eng more on the 340 than is generally used in scheduled operations on the 240.

The most impressive sight on the assembly line involved the machining, construction and assembly of the Convair 340 wing. After seeing this, you are bound to have faith in its ability to withstand tremendous loads. Each wing is a single unit from the center of the belly to the wing tip. The only splice in the wing assembly is at the middle, under the belly. However, there are repairable stations incorporated in its construction to facilitate rebuilding the wing in the event it is damaged. The engine nacelles are a part of the wing assembly, and the fuselage is literally set on top of the wing, and fastened to it.

The fuel tanks are constructed as an integral part of the wing, with the front and rear spars forming the fore and aft bulkheads. The fuel tank is subdivided by four baffle plates, which are also part of the cord-wise bracing of the wing. All rivets, bolts and fittings within the tank are treated before installation with a sealing compound and are coated with additional protective sealant on the inside of the tank after assembly. The minimum of valves, with two fuel shut-off valves and one cross-feed valve for each tank, help to eliminate the dangers of malfunctioning fuel valves. All fuel valves are electrically operated except the emergency shut-off valve, which is connected to the Engine Fluid Emergency Shut off control, and is manually operated.

The additional safety in having all fuel carried within the wing and outboard of the nacelle has already been well demonstrated in the past few years. The only fuel carried within or under the fuselage is in the cross-feed line, which is located between the spar cups, and was given special protection.

The total fuel capacity of the two tanks is 1,750 gallons. Fuel consumption at normal power was figured at 208 gallons per hour. This gives the 340 an average range of over 1200 miles at cruising power, with 250 gallons in reserve.

The 340 is powered with two Pratt & Whitney R-2800 CB-16 engines (*Continued on page* 54)

by Franklin D. Kalker

Product Promotion by Plane

When the Bristol-Myers Company of Canada decided to send a group of executives into the western provinces to meet retailers and wholesalers and take a first-hand look at local business conditions, four problems had to be solved before the caravan could get rolling. They were time, distance (it's big country), cost and a gimmick to generate news coverage.

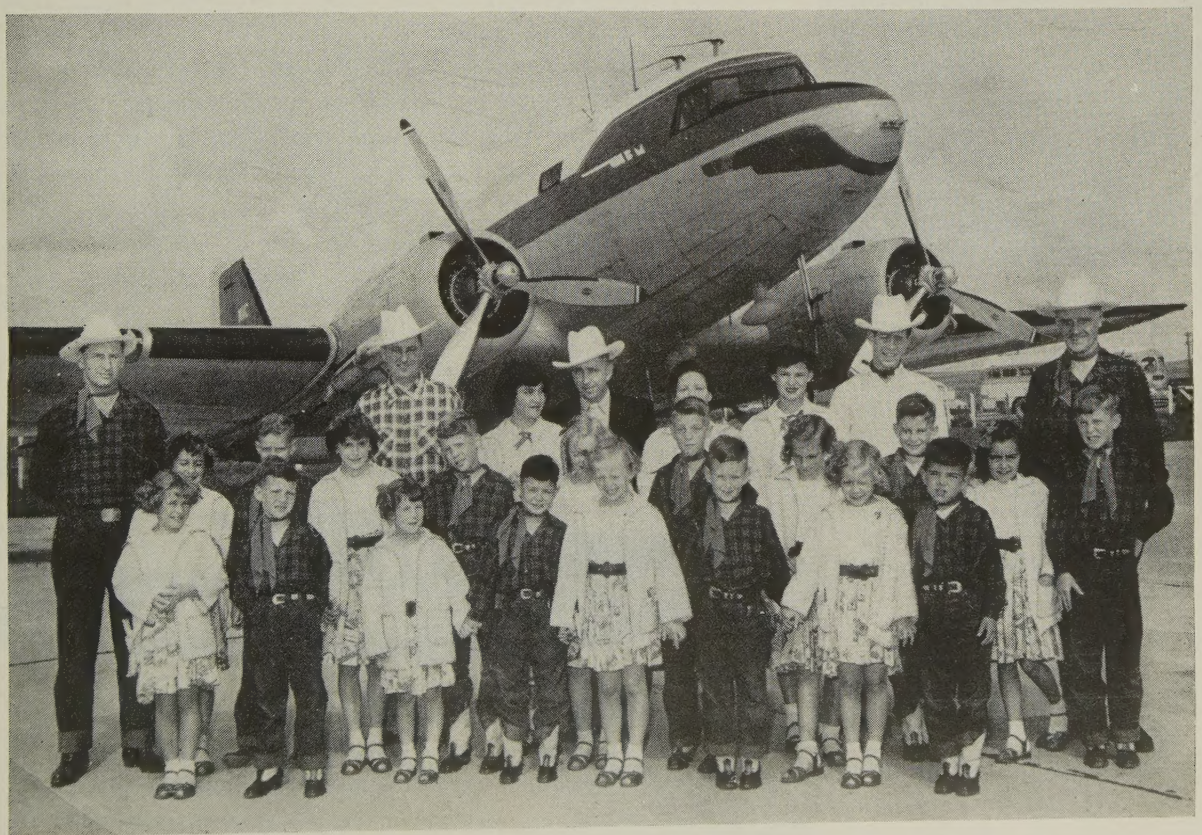
All four problems were solved neatly and simply by building the important 25-day sales promotion and good will tour around an executive airplane—the 14-passenger Bristoliner II, a DC-3.

The net result: A highly successful trip from the business viewpoint, a tremendous boost in good will, and complete radio and newspaper coverage in every community along the way. A Canadian magazine serving the drug industry labeled the flight "a new idea in sales promotion . . . and good will."

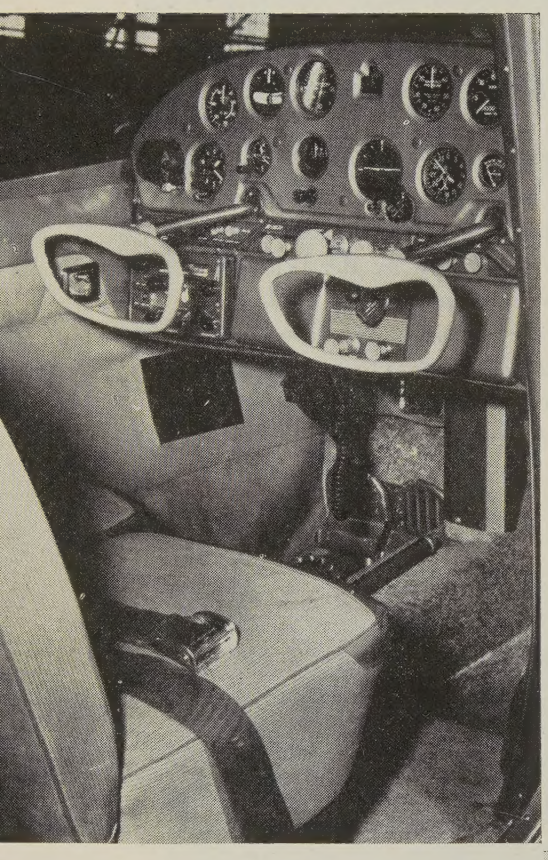
The air tour was a joint operation of the Bristol-Myers Company of Canada, Ltd., and an affiliate, Rubberset Company of Gravenhurst, Ont. The executive airplane was supplied by the Bristol-Myers Company of New York and Hillside, N. J.

With the itinerary worked out, Dave Flannery, B-M pilot, flew the Bristoliner II to Canada, stopping at Montreal, Gravenhurst (*Continued on page 35*)

BRISTOLINER II *served as courtesy-flighter on its product promotion air-tour through Canada. This group of youngsters from the Lacolme Orphanage in Calgary were among the 1500 men, women, children who were given free rides*



CESSNA'S NEW "180" and "310"



CESSNA 180 *(right) powered by 225-hp engine, has 1,150 fpm rate of climb, gross weight of 2,550 lbs., empty weight of 1,460 lbs. Standard equipment in cockpit (above) includes stall-warning indicator, manifold pressure gauge, cowl flap control, cylinder head temperature gauge, cabin radio loudspeaker, dual controls, etc.*

Business-plane owners and operators make up the intended market for Cessna Aircraft's two new models, the single-engine 180 and the twin-engine 310. Whereas the 180 is in production, the Model 310 is the something-to-look-forward-to; the prototype recently made its first flight. Cessna plans to have two 310's in the field throughout 1953 for accelerated and exhaustive service flight tests. Thus, the production model probably will not be available until early next year.

The Cessna 180, a four-place, all-metal Businessliner, is powered by a Continental 225-hp engine specifically designed to give the 180 a cruising speed of over 150 mph and still deliver maximum economy. The 180 has a 4½-hour range and can carry 120 lbs. of luggage in addition to its complement of four people. A fully adjustable horizontal stabilizer eliminates the use of trim tabs, all of which reduces drag and means an increase in cruise speed. The Model 180 also incorporates a cabin-controlled cowl flap which allows the pilot to accurately control engine temperature in flight or on the ground.

With standard equipment, the 180 sells for $12,950.00.

Of greater interest to the multi-engine aircraft operator is the new twin-engine Model 310 which incorporates wing-tip fuel tanks. This manner of carrying fuel has been requested by many cor-

porate-plane pilots and operators. With the fuel for the 310 carried this way, the wing space normally used for fuel is now utilized to house the main landing gear wheels. This arrangement not only adds safety but also allows the use of smaller, flatter and more streamlined engine cowling. The 310 seats four passengers and a pilot comfortably, and affords "adequate luggage space." No figures have been given out yet, so we can't judge the meaning of "adequate." A "first" in Commercial Private plane construction is the 310's internal radio antenna.

Powerplants are two 225-hp Continentals, with constant speed full feathering props. The engine nacelle exhausts, Augmenter Jet type, are symmetrically extended from cowling to the rear. According to Cessna officials, the Model 310 will be faster than any Commercial Private airplane of its class now on the market.

CESSNA 310 *is new five-pluce all-metal twin-engine plane powered by two 225-hp Continental engines. Additional safety feature of this new Model 310 is the wing-tip tanks where fuel is carried. Landing gear retracts into the wings*

Instrument Flight Clearances

by Keith L. Jimson
First Officer, Delta Air Lines

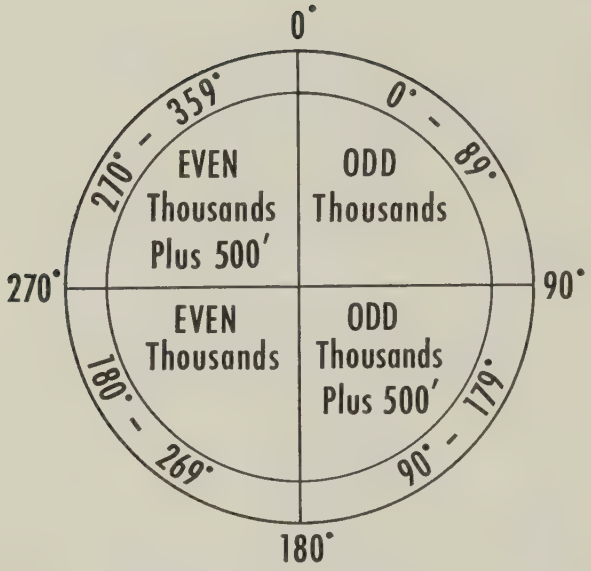


FIG. 1—*Regulations definitely state that instrument flights must fly at prescribed altitudes (above) when off airways*

AIRWAYS TRAFFIC *controllers keep close track of all instrument flights in their areas and provide adequate separation*

WHEN a pilot files an instrument flight clearance, he accepts the responsibility of following it to the letter. Only in this way can Air Traffic Control guarantee his separation from other flights flying instruments.

Air Traffic Control is strictly a service organization. Their only job is to see that all instrument flights are conducted safely. They can accomplish this only if all flights operating on an instrument flight plan follow the clearances given to them. These clearances will not always be exactly what the pilot asked for, but are given to provide separation with the least amount of delay to the departing plane. When the clearance given is not the one asked for, ATC will give the reason for the change; such as, "Unable to approve 4,000 feet account of traffic."

One of the most important factors governing safe instrument operation is having up-to-date information on radio facilities and field conditions. Range legs are shifted, approach procedures are changed, new airports are built and defense areas are set up. Many airports are lengthening runways or adding new ones. Before ever filing an instrument clearance, be sure to have the most recent information concerning the route to be flown.

There are many misunderstandings by pilots when flying instruments. One of the most frequent of these is that an instrument clearance will guarantee separation from uncontrolled traffic when the weather is VFR. There are still a few pilots who believe they can file a flight plan, receive an instrument clearance, and then fly their assigned altitude with no regard for other flights. If the weather at your altitude is VFR, other aircraft flying VFR are perfectly legal to fly at the same altitude as that used by IFR traffic. VFR traffic can also climb or descend through your altitude as long as it remains VFR. The instrument flight will have to be on the

AIRWAYS *controllers are constantly checking, according to an aircraft's speed, to get an estimate of where next report should place the plane. If report does not jibe with estimate, something is wrong*

alert for other flights at all times in marginal or VFR weather.

The instrument pilot should keep to the right at all times, especially in congested or high-density areas and when climbing or descending unless otherwise directed by ATC. Remember with the present-day speeds of airline and military aircraft, the closing speed can be more than 10 miles a minute. If the visibility is three miles, that will allow just 18 seconds to see the other aircraft and take corrective measures to avoid a collision. The safest policy is to fly at the prescribed altitudes for the direction being flown, whether on VFR or IFR.

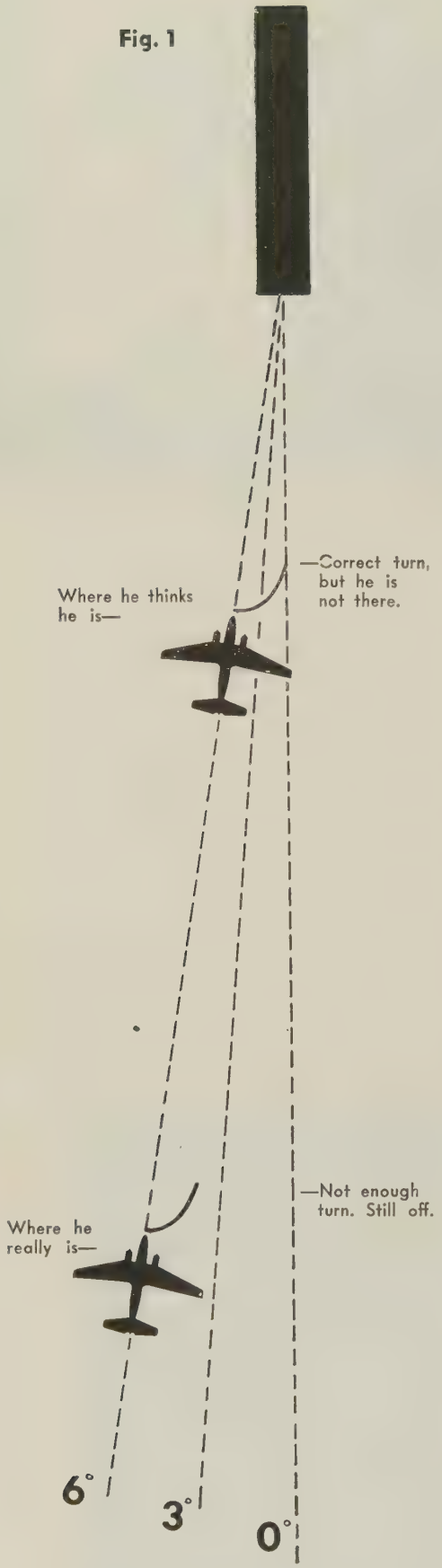
Another common error that could cause a collision is not flying the cleared course. This is usually around the congested areas where there are several different airways very close together. An example of this is filing a clearance out of Chicago to Cincinnati via airways. The clearance comes through as "*ATC clears Delta flight 637 to the Greater Cincinnati Airport via Red 43, Red 42, Red 18. Climb to and maintain 9,000 feet. Report passing Monee.*" This isn't the most direct route. This probably isn't the route asked for. ATC probably will not give any reason for not giving the clearance via Red 14 and Red 18 which is the most direct route, because the clearance they did give is standard for departures in that direction. They let the incoming traffic descend on Red 14, so can't clear outbound flights to climb out on Red 14. The pilot must always make sure he copies the clearance correctly and make doubly sure he flies the cleared course. It is always a good idea to copy the clearance down as it is given. In this way the pilot won't be in doubt later as to how he was cleared. A simple way to do this is to abbreviate the clearance something like this, "*C to CVG Apt. R. 43, 42, 18, M 9,000 report Monee.*"

Another error that causes all kinds of trouble is having someone get lost while on instruments. Air Traffic Control can't let any other ship climb or descend through the lost aircraft's altitude until he is found. The pilot must never forget to report over a reporting point, or he will be considered lost and cause other traffic to hold until he is heard from.

Some traffic delays are caused by the pilot not being ready to leave a holding point as soon as cleared. When the pilot is required to hold at a holding point, he will be given an expected approach time, such as "*Cleared to the outer marker, hold west, expect approach time 10:27.*" The pilot must time his race-track pattern so as to be in a position to start an approach at that time. A delay of three minutes is magnified all the way back through the stack.

If a pilot knows what to expect from each type of clearance, it will make the flight easier. For example, any time a flight is over 30 minutes long, the clearance will usually read to the airport rather than to an approach facility. ("*ATC clears Delta flight 203 to the Jackson airport,*" etc.) Why to the airport rather than to the range or the outer marker? Air Traffic Control tries to work at least 30 minutes ahead. They know 30 minutes in advance what the traffic at any airport is going to be. Any further ahead than that they can't be sure, because traffic taking off from fields that (*Continued on page 48*)

Fig. 1



LOW DOWN on the

The first time a pilot uses the ILS (Instrument Landing System), he goes through all the contortions of an old maid's fanny in a rumba. He finds the thing a kind of confidence game, alluring but tricky and deceiving. And this goes for the best of us, the veteran flyers as well as the new ones. Not from any of us will you hear about the difficulties, though, and the reason for the silence lies in the human nature with which we are all beset, more's the pity. A pilot, especially one of us bristling airline pilots, who gets tangled up on an ILS approach has a sneaking suspicion that maybe the other fellows are doing much better—at least *they* aren't talking! So he does not wish to make himself prominent by admitting he was bediddled by the darn thing. A conspiracy of silence! Thus it is that no one in his right mind dares to tell you the truth about the difficulties with the ILS and how to cope with them. But, I'm a coper at heart, and no one has successfully accused me of being in my right mind, not even the seldom CAA.

Let us take an example of an ILS approach. Our hero is the pilot who is newly going to make advances, so to speak, toward the ILS, having read the propaganda on the subject.

A typical approach on the ILS

Here is a typical blind approach on the ILS. Not wanting to cast nasturtiums on anyone else, I shall use myself as the horrible example.

On this here early occasion I used my native intelligence. I am pretty darn smart, although not smart enough to do anything but fly airliners, so I went way the hell and gone back before I hooked onto the ILS beam.

For the sake of any newcomers, let me say that the ILS consists of two short-wave beams. One beam is supposed to show the track to the runway, and the other beam shows the glide path. Each beam works a needle on the face of the instrument on the dash panel: one needle for the track, a vertical one; and one for the path, a horizontal one. The whole instrument is called the "Yokelizer" by the pilots who have been joked by it. Officially,

By Hy Sheridan

Capt., American Airlines

LET-DOWN

however, the name is Localizer. The pilots are closer.

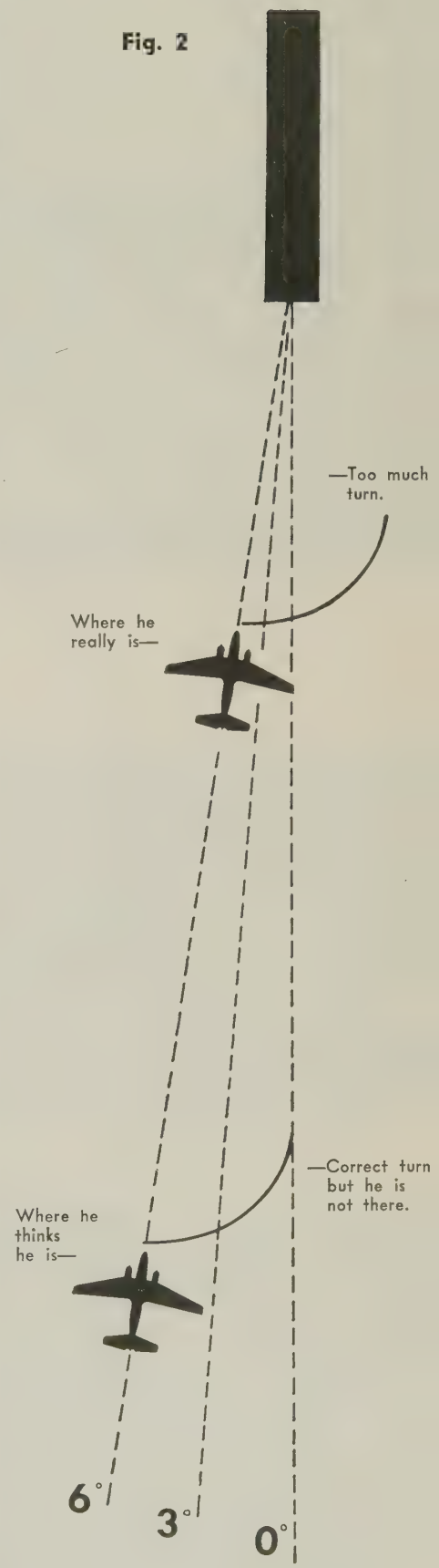
Well, on this approach, I went way back so that I would have time to get lined up with the two beams and settled down to "bracket" them, as it is sometimes called. I hooked onto the beams. I got the needles in the center of the instrument and I held them there quite nicely. Calling those little hands "needles" is appropriate enough for, before I got to this point in my flying career, I got needled by them plenty. They'll get your goat and that's no kid.

Well, the needles held in the center very nicely indeed, and I began to think that I was quite a fellow, right spry, tooey. I took a good look at the gyro compass and got my heading and I was going to hold it, come Democrats or high water. Duck soup, this ILS—but I forgot to duck.

When we were closer in, the track needle, as though pushed over by the hand of a leprechaun, cantered off to the side. Now, the way you fly a Localizer, according to the instruction book written by men who never spun anything save a swivel chair, is to chase the needle. That is, if the needle is on the left, you nose the ship to the left. What could be simpler than that? (Quiet, please) Pretty soon the needle started coming back toward the center of the instrument. Hooray. But then the naughty thing flopped hard over to the right, going off faster than it had the time before. Now, here was a pretty pass, as Sadie the Stewardess would phrase it.

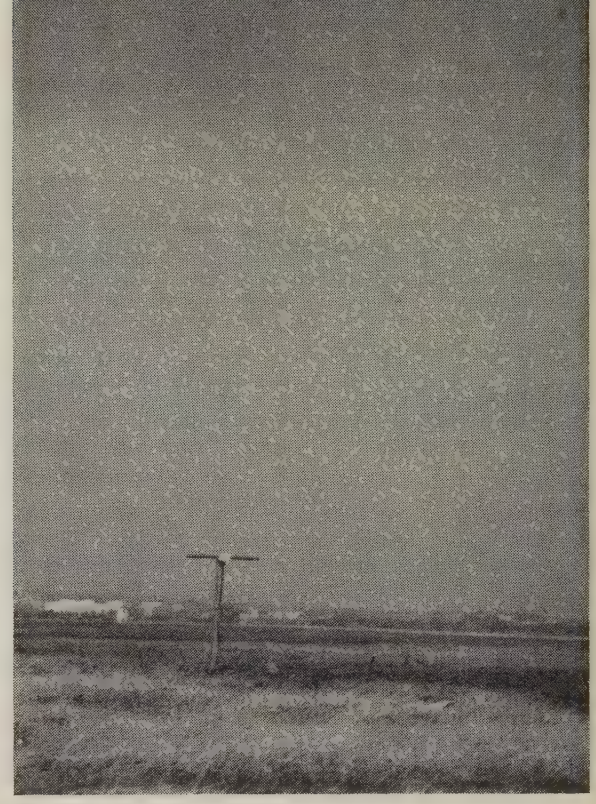
During all of this time, I had been a pretty busy fellow. I concentrated on the heading. I concentrated on the airspeed. I concentrated on the altimeter. I concentrated on the rate of descent instrument. And, of course, I concentrated on the artificial horizon and the turn-and-bank in order to keep the shebang in some kind of balance, in some rectitude with the three dimensions that I had been taught. That kept me kind of busy and I was not able to visualize any too well how close in I was to the touchdown end of the runway. For all I knew, I was pretty well in, close. And if so, I would have to hurry to get back on that track, so I nosed to the right after the needle and I nosed in something of a hurry. The needle promptly flopped to the left. I jerked (*Continued on page 52*)

Fig. 2



by Frank L. Harvey

Low-Cost Approach System



TVOR's future bright; predictions claim 200 in operation by mid-'56

A low-cost method of making instrument approaches in bad weather is now being packaged by several manufacturers for sale to corporation air-transport departments, municipalities and the airlines. They call it TVOR. It is the regular standard CAA omnirange stripped to the bare bones—no standby power, no DME, no dual transmitters or dual monitors, and 50 watts instead of 150 watts of power. The TVOR—which, in complicated language, stands for "Terminal Very High Frequency Omni-directional Range"—is not something new and mysterious. It has two differences from standard VOR. It is considerably less expensive—roughly, $10,000 as against $90,000 for the CAA standard navigational station. It is situated right on the airfield wherever possible, and as close to the intersections of the runways as can be managed. Being placed in this location, the Terminal Omni broadcasts its directional beams approximately along each runway. These beams give a pilot a heading for whichever runway he intends to land on after his instrument let-down.

To use TVOR as a low-weather approach system, you first follow it to the airfield, just as you would a standard navigational VOR. Then, when you get a needle indication that you are directly over the field, you start a standard instrument routine: a timed leg out . . . a procedure turn . . . and then a final let-down, following the TVOR beam until you break out the bottom of the overcast, then making the landing by VFR.

The powerful and conservative Air Transport Association, which is not in the habit of getting involved with ideas which have limited utility, have gone all out for TVOR. They actually built a TVOR themselves, using mostly off-the-shelf items, for only $5,000, just to prove to manufacturers that it could be done. This design was installed at Baltimore International's Friendship Airport, tested thoroughly, and proved itself to be "more accurate and more stable than previous VOR's of any type known to ATA personnel." The Maximum Station Error, based on ground checks, was plus 1°, minus .7°. Maximum Station Error, flight checked for elevation angles of 3° to 12°, was plus or minus .9°. The installation had a 45-mile range for planes flying at 1500 feet in that area. Being a line-of-site device, the range would increase a great deal the higher the plane climbed. The "Over" indication of the ATA installation was excellent. An Eastern Air Lines flight passing over the station at 14,000 feet reported that the change from "To" to "From" required less than five seconds.

This original ATA Terminal Omni set was so successful that it has been transferred to a field near Ithaca, New York, for further evaluation by Mo-

CAA VERSION *of Terminal Omni has been installed at Washington National Airport (above) for extensive low-weather evaluation tests. By April of this year the CAA expects to have eight more TVOR's installed at other fields*

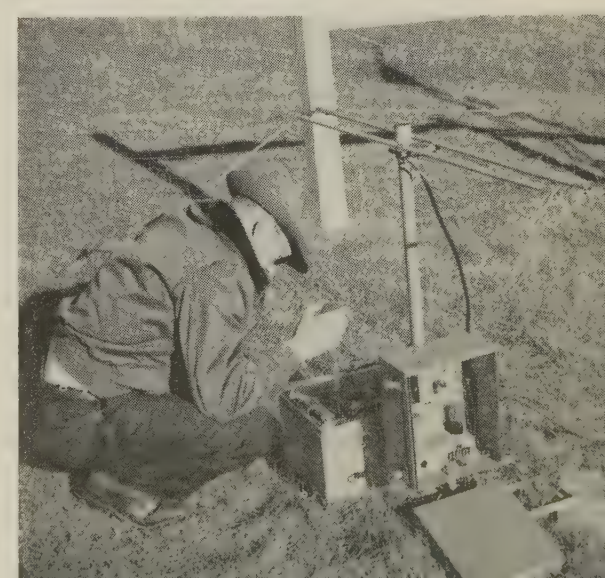
hawk Airlines. Mohawk now uses an H-facility for its instrument let-downs at Ithaca. By installing TVOR, a direct appraisal of the merits of the two systems will be obtained. If TVOR works as expected, Mohawk may install it elsewhere.

Pan American Airlines have picked up the idea and installed an Omni on their Roberts Field, Liberia, West Africa. Static is unusually bad in this area. Pan Am will use the VHF feature of the omni to eliminate static troubles and help communications; they will also use the facility to make landings in low weather, thus avoiding expensive and irksome "fly pasts."

The heart of the ATA Terminal Omni is the Alford antenna. Standard CAA stations use a complicated five-loop antenna, and there are only a limited number of experts who are capable of matching this five-loop array adequately to the omni transmitter. It is a long ticklish job and, if a change in frequency is made, the job must be done all over again.

The Alford antenna, on the other hand, is delivered to the buyer all ready for use—no matching necessary. This antenna is locked "on frequency" when you get it. Just hook it up and you're in business. If a change in fre- (*Continued on page 49*)

PLANS *for shelter (above) are furnished with each TVOR built, marketed by the Maryland Electronics*



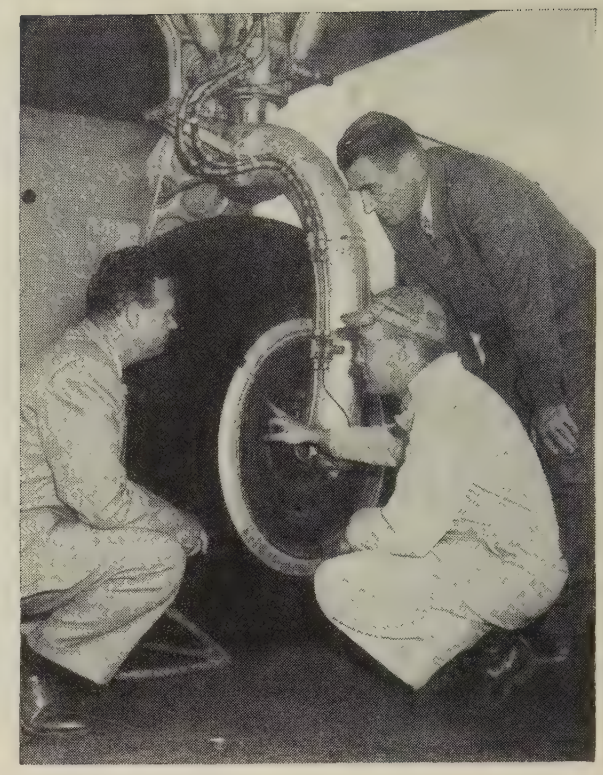
CAA-DEVELOPED TVOR *Marker was designed to operate in 108-118 mc band: It gives quick range fix by heterodyne beat*

Planned Maintenance

by Leonard Lee

Chief of Maintenance
Air Trans. Dept., Continental Can Company

as told to
Frank L. Harvey



MAINTENANCE *on Continental Can's four aircraft is done by CC's own men. Here Chief Pilot Brown, Flight Engr. Kincaid and Maintenance Chief Lee check B-24's gear*

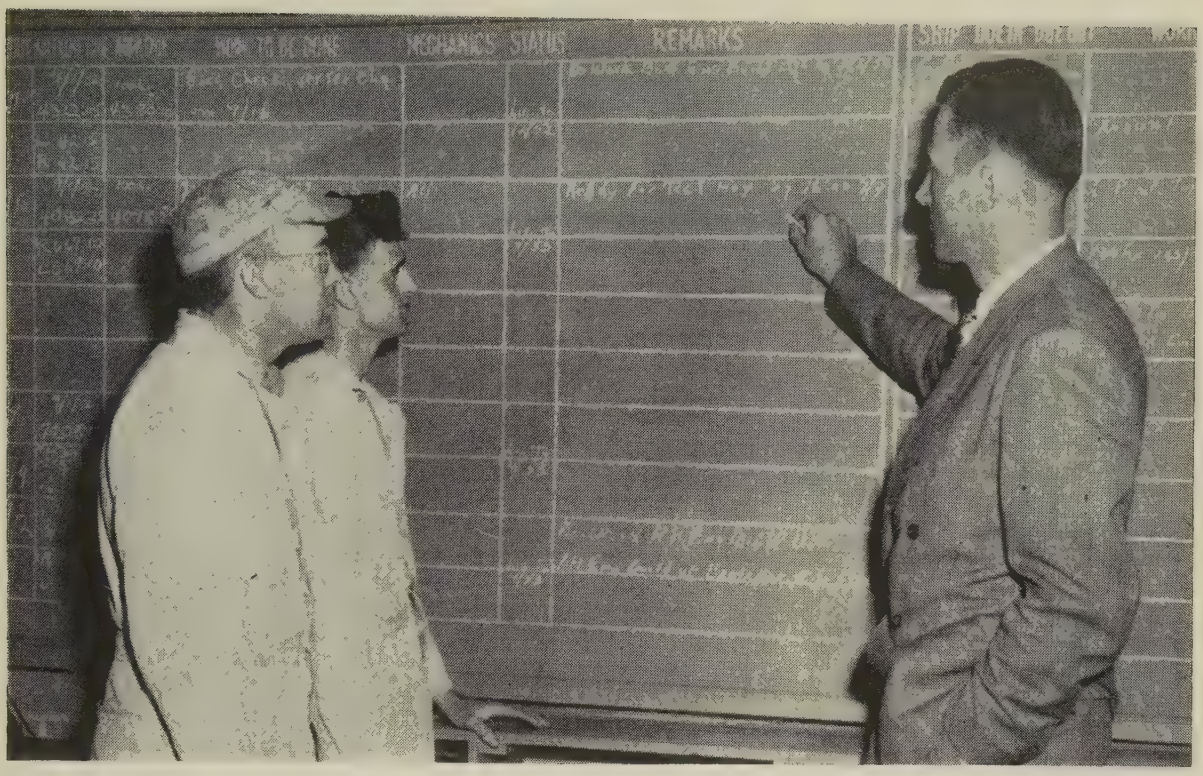
A lot of people think aviation maintenance is a pretty dull business. They are perfectly willing to glamorize the "guy up front" who lifts his roaring craft up into the wild blue, but they are apt to feel a little patronizing toward the "poor grease monkey" who sits home on the ground in a puddle of oil and never does anything more exciting than skin his knuckles when a wrench slips.

They're wrong.

In the first place, we have no "grease monkeys" at Continental. We issue spic-and-span uniforms, freshly laundered and pressed at company expense, twice a week—oftener if necessary. We insist that every mechanical job be clean *at the start* as well as at the finish. Seven years with a slogan "keep it clean" have shown us definitely that a mechanic puts out better work—consistently—if he's clean himself and is working in clean, comfortable surroundings.

Our brand new $300,000 hangar in Morristown, N. J., is a mechanic's dream. Partly, I believe, because I'm a mechanic myself and had a chance to ask for the things that I know a mech wants. Good light, safe, new tools, adequate heat in winter, and a decent place to relax when he gets a coffee break. Our mechanic's ready room is as comfortable as the lounging room at a swanky golf club—though not as fancy, of course. It's air conditioned, fitted with tile showers, new washing facilities, easy chairs and lounges, and a refrigerator stocked with cokes and snacks if a man is hungry.

Our guys aren't bored with their jobs. They like their jobs or we wouldn't hire them. If there's one single thing we've learned in seven years of keeping airplanes flying, it's this: no shop is any better than the guys in it. We don't want boomers who are in to work a month or so, pick up a check, and fade away. We want people who want to make the Air Transport Department of Continental Can their lifetime job. To get them we know *we* have to go down the line, too, and help them to advance from one job to a better one, as they rate it. Our key men are those who came in at moderate salaries and limited responsibilities, and earned their increases through hard work. We don't throw bouquets around at Continental, but when a man is on the ball we know it, and eventually, by his steady advance, he knows we know it. Our keynote is: "Plan your work . . . and work your plan." We try to make each man a responsible, executive-type operator—a man who doesn't have to yell for instructions each time he finishes tightening a bolt.



DISPATCH BOARD *in CC's hangar carries pertinent information on each of the planes. Board records date airplane is due in shop for work; hours on airframe, engine; etc.*

but who can sit down and plan his way through the whole job before he makes a move. I myself do the over-all planning of what jobs will be done and when. Bob Blume, my hangar foreman, then assigns a mechanic to the work. And if the man does it the way we want him to, the next thing you know he's chalking up a finished item on the master blackboard.

We carry full pertinent information on each one of our airplanes on this big board at the head end of the shop. The board tells us:

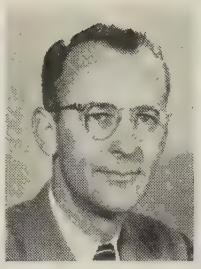
(1) Date the airplane is due into the shop for maintenance.
(2) Date the airplane is due out of the shop again.
(3) Number of total hours on the airframe, with date.
(4) Number of total hours on the airframe when the next major inspection is due (with type of inspection noted).
(5) Work to be done, in detail.
(6) Mechanics assigned to the job.
(7) Status of the work at the moment.
(8) Remarks.

We operate four airplanes: A B-24 *Liberator*, a Lockheed *Lodestar* and two Twin-Beeches. All the above information is kept current, on the board, on each plane. Everybody in the outfit thus knows exactly how we are doing at any given moment.

We carry a similar board for the other planes we hangar and service: a DC-3 for the Celanese Corporation, a B-23 for General Electric, a PV-1 *Ventura* for Triangle Cable and Conduit Company, a Twin-Beech for the Red Devil Tool Company, a *Navion* for the Texas Oil Company, and a Twin-Beech and a North American SNJ for the Navy. These companies supply a supervisor for their maintenance. We supply the tools and the manpower to whip the job. Naturally our insurance bill is a whopper—$37,000 for the spread—but that includes everything: hangar-keeper liability, workmanship liability, product liability, fire, theft, accident, the whole works. We don't begrudge a penny of it, and feel that any really substantial corporation air transport department must be fully and adequately insured before a wheel is turned.

Since we know that the lives of our top executives —and those of our important clients—are always riding with the quality of our tools, parts, and workmanship, we've tried to cover the bases as carefully as humanly possible. For example, we carry one of the largest (*Continued on page 34*)

A. M. Recker



Dan S. Tilden

J. H. DuBuque

E. M. Scott

Tom Wolfe

A. S. Galbraith

L. F. Zygmunt

A. M. RECKER, Mgr. of commercial sales dept. of Goodyear Tire & Rubber Co's. aviation products division, has been with Goodyear since 1926, and in its aviation department for 10 years. He is on ADMA's Board.

L. F. ZYGMUNT, better known as 'Larry' Zygmunt, is Pres. and co-founder of General Aircraft Supply Corp. Flying since he was 14, Larry was a B-24 pilot and flew 33 U.S. to Australia missions during war.

G. R. Gaillard

G. R. GAILLARD, Director of the Office of Aviation Defense Requirements of the CAA, was a Colonel, USAF-Reserve during World War II in charge of Air Force Aeronautical Standards Program.

L. W. Trees

L. W. TREES has been Service Manager of Scintilla Magneto Division of Bendix since 1939. He joined Scintilla in 1926, after six years in government service as a technician. Mr. Trees is based in Sidney, N. Y.

H. D. WIGLEY, Director of Delta Air Lines' procurement, entered the field of aviation in 1932 when he joined Eastern Air Lines and was placed in charge of engine-overhaul stockroom. He went with Delta '36.

H. D. Wigley

HUGH COPELAND, Vice President and Director of Training for the Embry Riddle School of Aviation, spent 14 years as Director of Roosevelt Aviation School, Mineola, N.Y., before joining Embry Riddle.

DAN S. TILDEN, Service Manager of Eclipse-Pioneer Division of Bendix since 1942, began his career in 1928 with Curtiss-Wright in Buffalo. He was associated with American Airlines for over 11 years.

Hugh Copeland

JEAN H. DUBUQUE, Executive Director of Corporation Aircraft Owners Association, has been active in aviation for the past 20 years. He is a member of Institute of Aeronautical Sciences, Air Reserve Assn.

EARLE M. SCOTT, President of Scott Aviation, has been active in aviation since early 20's. He developed one of first aviation marketing systems to sell products entirely through aviation product distributors.

TOM WOLFE has been active in aviation circles since 1924. Now President of Pacific Airmotive Corp., Mr. Wolfe formerly was Vice President in charge of Traffic, Advertising, Publicity for Western Air Lines.

A. S. GALBRAITH, Division Supply Manager of Pan American's Latin American Division, joined Pan Am in 1930 in Purchasing Dept; later became Purchasing Manager, set up central purchasing dept.

R. B. KENTY, Vice President of Air Associates, began his commercial aviation career some 22 years ago with old Curtiss-Wright Flying Service. He joined Air Associates in 1931. He holds pilot's license.

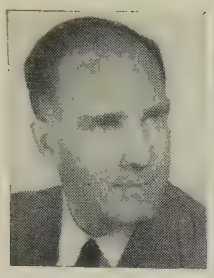
PAUL A. KENNEDY began his career with Southwest Airmotive in 1942 as an instrument technician and is now Sales Mgr. and Secretary of SAC. He is a director of Aviation Distributors & Manufacturers Assn.

FRANCIS L. HINE has been President of Airwork Corporation since 1946. A graduate of Yale (1939), he joined IBM Corp. in 1939 and served as Sales Engineer until 1946. He is a Lt. Colonel in U. S. Army.

GEORGE W. JALONICK III, one of three principal owners of Southwest Airmotive, is Vice President in charge of Sales. In 1952 he was president of Aviation Distributors & Manufacturers Assn.; joined SAC in '40.

THOMAS H. DAVIS, President of Piedmont Airlines, learned to fly when he was 16 and was flight instructor while in college. He joined Piedmont Aviation in 1939 when it was known as Camel City Flying Serv.

FRANK J. AMBROSE, President and owner of Frank Ambrose Aviation Co., Inc., Miami, Florida, began his aviation career with Glenn L. Martin Co. (then in Cleveland, Ohio) in 1917. He barnstormed a Jenny around the country for three years (1923-26), then became an air-mail pilot. He became Manager of Curtiss-Wright Flying Service in 1929, and a dealer in airline aircraft in 1933. He organized his present, Frank Ambrose Aviation, in 1941.



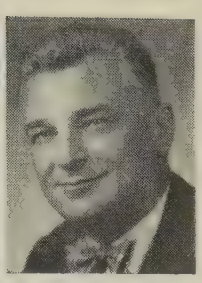
R. B. Kenty

P. A. Kennedy

F. L. Hine

G. W. Jalonick III

T. H. Davis



F. J. Ambrose

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

MARCH, 1953

Kenilworth Hotel, Miami, Fla.

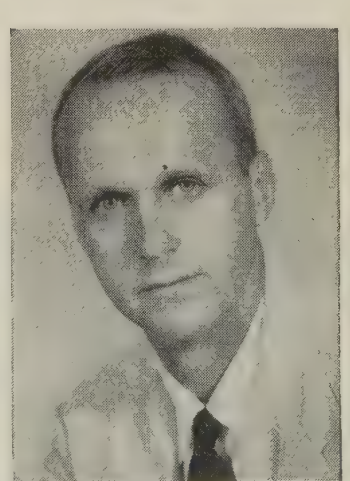
Problems in Parts Distribution

airline, corporate, military, fixed base

Beverly Howard *(Pres., Hawthorne School of Aeronautics):* "One of the prime problems facing all operators of aircraft today is that of airframe, engine and accessory parts replacement. You who are participating in this Flight Operations Round Table are experts in the field and it's from you that we are seeking suggestions for solutions to this vital problem. I'm sure we are all aware of the need for an answer, and perhaps this discussion will open up avenues of thought that will lead to the eventual elimination of parts distribution as a problem.

"Since the airlines are among the largest operators in the country and sit very close to the subject under discussion today, I'm going to call on Tom Davis who is not only an outstanding airline operator but also a fixed base operator. He undoubtedly knows the problem from both angles."

Tom Davis *(Pres., Piedmont Aviation, Inc.):* "From my conversations with our purchasing people, I gather our problems are not very different from those of other air carriers. Primarily, the difficulty today stems from the so-called lead time that is necessary in the procurement of replacement parts. Quite frequently we are faced with runs on certain parts. We may need a dozen or more of one particular unit in one month's time, whereas over the previous



BEVERLY E. HOWARD, known throughout the aviation industry as Bevo, served as moderator of this Round Table, held at Kenilworth Hotel in Miami. Bevo is president of Hawthorne School of Aeronautics and the Hawthorne Flying Service which operates a chain of fixed base operations.

12 months we had used only two or three. It's a difficult problem to forecast these unusual situations, and it's a problem not only for us but for the distributor and the manufacturer as well. However, we can all help each other if we give those factors more consideration than we have in the past.

"The parts problem is, perhaps, more noticeable to those of us who are small operators and cannot afford to have enough parts on our shelves to last two or three years, and are expected to put in orders that far ahead of time to assure delivery. It is asking a lot to be expected to have that much stock on hand ourselves, or when we expect a distributor to have that much stock available in a business such as this that is moving so fast and in which we constantly face obsolescence through model changes, substitutions, etc.

"We hope the military program and the labor situation (strikes, etc.) will settle on a more even keel, thus permitting a more steady and reliable distribution program. If we all coordinate our efforts to those ends, it should relieve the replacement-parts problem considerably.

"Another thing which has come to my attention recently and which seems to me to be a pretty serious problem is the lack of coordination between the manufacturers of accessories and the manufacturers of engines and airframes. It is an important problem to us because we're confronted with an equipment-replacement program. We've seen new equipment developed and sold to the operators, and then after just a few months operation, one or more of the accessories on the engine or airframe is found to be inadequate to take care of that particular type of operation or that particular airframe or engine—all this after the part was originally thought to be absolutely the 'last word.'

"In tracking down the problem, you'll find that the engine manufacturer, for example, won't change his molds or castings to properly adapt that particular engine to a more usable and a more certain accessory that would do the job without requiring constant replacement. Then you go to the accessory manufacturer and he says, 'It's impossible to develop an accessory of the capacity needed for the job unless we get cooperation from the engine manufacturer.' I think the same general picture is true from the standpoint of the airframe itself and its accessories.

"That problem is something that we, as operators, are going to be pretty doggone sure is cleared up before the time comes for agreement on any particular airplane or engine. We have to have as much agreement as possible from all of those involved in the manufacture of accessories, engines, airframes, and the operators, too, on the practicability of the various units incorporated in the airplane."

Bevo Howard: *"What about the availability of parts, Tom?"*

Tom Davis: "Fortunately, in our particular operation we've been able to use a lot of surplus because we operate nothing but DC-3 aircraft. We've been in a much better position than a lot of operators who have postwar equipment. However, as you all know, the parts availability for DC-3's and R-1830 engines is becoming rapidly nonexistent in the surplus mar-

SKYWAYS ROUND TABLE, *held in Miami following meeting of Aviation Distributors & Manufacturers Assn., dealt with problems of parts distribution. Participants were key men representing airlines, manufacturers, military, etc.*

PRE-ROUND TABLE, *confab brought H. D. Wigley (left to right), G. R. Gaillard and Archie S. Galbraith together*

ket. There again, we have to go back to the terrifically long lead time, particularly with airframe parts. With few exceptions, parts normally distributed through regular channels haven't created much of a problem as yet.

"The parts availability problem is attributable to the airlines not having educated the distributors as to what a reasonable stock of parts would be and not giving them a more accurate estimate regarding their future requirements.

"In some cases it goes back to the fact that the distributor is unwilling to stock a part in quantity when it is only called for spasmodically.

"From the distribution standpoint regarding miscellaneous parts, excluding airframe parts, we haven't had any really serious problems. I presume it's because we're operating obsolete airplanes."

Bevo Howard: *"Thank you, Tom. Now let's jump over to another airline operator. We're fortunate in having Archie Galbraith, a key man with Pan American Airways, with us."*

A. S. Galbraith *(Div. Supply Mgr., Pan American World Airways):* "Well, our problem is slightly different than Mr. Davis'. We have both the older type aircraft and many of the new type. We find that it's been either a feast or a famine with us. Shortly after the war, there were more parts for the aircraft we were operating than we could possibly need. Since then, however, we've gotten into a new type of aircraft and world conditions have changed, and we've found it extremely difficult to get many of the parts needed for the newer aircraft.

"Pan American follows a policy of dealing as directly as possible with the manufacturers of the aircraft or major components, but in many cases we are inclined to feel that the aircraft manufacturer doesn't always have our complete interest at heart enough to make certain that the accessory manufacturers or the major parts manufacturers follow a policy of maintaining an inventory of parts for us.

"We all run into problems of unusual parts usage which we cannot anticipate, and I guess there is no certain way to correct that."

Bevo Howard: *"As I said before, I'd like to keep this discussion centered momentarily around airline operators. Mr. Wigley of Delta Air Lines has had a vast amount of experience in supply as it relates to airline operations."*

H. D. Wigley *(Director of Procurement, Delta Air Lines):* "I'd like to elaborate on what Mr. Davis said, namely, lead time. We feel that the airlines are being asked for too long a lead time.

"The upsurge in usage is a problem with all of us, of course, but in our case we feel that the manufacturers, in many cases, could have anticipated those upsurges in usage because of past experience with operators who have operated this equipment much longer than some of the rest of us. That has been a real problem, particularly in engines and accessories.

"On the point of distribution, we of the airlines have fought long and hard with the manufacturers to keep one source of supply available to all of us, rather than many sources. The domestic-carrier inventory is something like $100,000,000. We had a case recently where an accessory manufacturer fell down completely on deliveries of one part. It got so bad that our engineering (*Continued on page 38*)

AIR CARRIER *position was pre-meeting subject discussed by A. S. Galbraith, Tom Wolfe (standing), A. M. Recker*

SKYWAYS FOR BUSINESS

NEWS NOTES FOR PILOTS, PLANE OWNERS OPERATING AIRCRAFT IN THE INTEREST OF BUSINESS

ATLAS SKY MERCHANT, *executive DC-4, gets 100-hour engine inspection prior to take-off for East Coast where it delivered toys to various orphanages in New England states*

Atlas Supply Company Uses Its DC-4 to Airlift Toys to Orphans

Burbank, Calif. Atlas Supply Company's big DC-4 took time off from its regular air chores this past Christmas season to bring joy and gladness to the hearts of the many children in the New England orphanages. The airplane airlifted more than 18 tons of toys from Santa's Work Shop at North Pole, N. Y. to the hundreds of orphans who were waiting at the various local airports where the DC-4 landed. The toys were distributed to the children by both Atlas Supply and Standard Oil Companies.

Called the *Sky Merchant,* the Atlas Supply DC-4 was converted a few years ago into the world's first flying showroom. Displays of Atlas tires, batteries and accessories are mounted at the forward end of the Sky Merchant cabin. Built-in display boards and these mounted products bring sales messages to every visitor aboard the plane. An integral screen can be pulled down for the showing of motion pictures. There are 16 lounge-type seats for in-flight use and for plane-board meetings of dealers and other guests.

For the past three years, Atlas Supply has used the *Sky Merchant* as a goodwill ambassador for its products. In that time the DC-4 has made two tours of the United States and Canada, and has flown three extended international business missions. It has visited nearly every country of the world. A recent tour of the *Sky Merchant* included North Africa and Europe by way of Bermuda and the Azores. At every stop, local officials and native citizenry inspected the plane.

According to officials of the Atlas Supply Company, the *Sky Merchant* has shown that the American business corporation doing business at home and abroad can use the airplane to take its marketing organization and its dealers a complete exhibit of products and its latest sales story in a shorter time and at less cost than by any other method.

Commander of the *Sky Merchant* is E. E. Aldrin, Manager of Atlas Supply's Aviation Department.

Coast & Geodetic Survey Redesigns Charts for use with ILS

Washington, D. C. In order to meet civil and military requirements, the series of aeronautical charts designed for use with ILS has been extensively revised.

The format of the charts has been changed to two colors to satisfy both civil and military needs and to insure easier readability. On the approach side of the chart, black is used for base information and the aeronautical data is shown in blue. Base information is confined to urban areas and major drainage. Aeronautical information includes transition from primary and secondary fixes; frequencies broken down by use, *i.e.* approach or other control; localizer and tower; airports with runway lengths of over 3500 ft.; obstructions and beacons. Also, landing minima for both circling and straight-in approaches are shown as well as the rate of descent speeds in knots and statute miles per hour.

The profile box formerly shown on the landing side of the chart is now on the approach side and is similar to the standard profile indicated on other charts of the AL series.

The landing side of the chart has been redesigned to show a relatively large-scale drawing of the airport area out to the middle marker. Detailed info relative to the approach and runway lighting is given pictorially and in written form. Such details provide a pilot with a relatively clear picture of ground installations that are observed on entering the area of visibility. In addition, complete ceiling and visibility minima for civil use (take-off, circling, straight-in, and alternate) are shown in the lower section for aircraft with stall speeds of 75 mph or less and for speeds of over 75 mph.

These ILS charts are distributed at five cents per copy, with automatic distribution on an annual subscription basis available for users who require charts in large quantities.

Bonanza Striped as Visibility Safe-Guard Against Collision

Dallas, Texas. Mid-air collisions are the concern of everyone, and one man in particular decided to do something about it as far as his airplane was concerned. He had his Beech *Bonanza* painted with yellow and black stripes so that the airplane would not be hard to notice in flight.

STRIPES, *yellow and black, were painted on Bonanza to make it more visible*

Present pilot of the striped *Bonanza*, Dan M. Burkhalter of Lubbock, Texas, reports the airplane attracts a lot of attention wherever he flies. All of which is good as far as ground or mid-air collisions are concerned.

Butler Company Takes Over Shell Oil Distribution at LaGuardia

New York, N. Y. Shell Oil Company announced recently that the Butler Company, Aviation Division, has taken over the distribution of Shell aviation products at LaGuardia Field as part of its new "fixed base operations," offering hangar facilities and complete maintenance and repair services for private and executive aircraft.

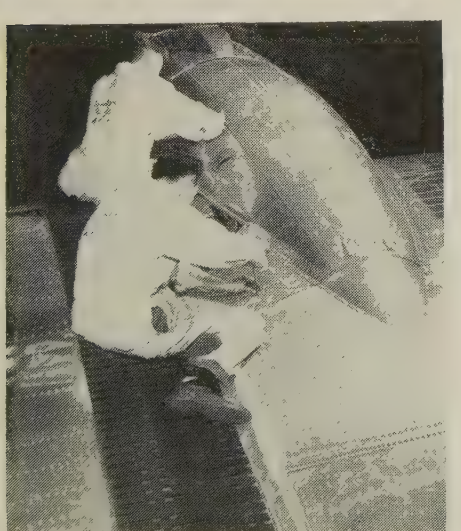
As reported here several months ago, the Butler Company now occupies the former Pan American Airways' hangar in the section of LaGuardia Field designated by the Port of New York Authority for use by private, corporate and non-scheduled aircraft.

The Butler Company sells grades 80, 91 and 100 Shell aviation gasoline as well as a complete line or Aero Shell lubricants. This new service at LaGuardia is similar to that provided by the Butler Company at National Airport, Washington, D. C., and Midway Airport and Meigs Field, Chicago. Facilities include storage space, service departments, lounges for pilots and executives, a conference room, and station wagons for carrying travelers to and from runway aprons.

Rubber Runner Guarantees Slip-Proof Footing on Aircraft Wings

Toledo, Ohio. A new-type matting has been made available by the American Mat Corporation of Toledo, Ohio. This matting, called Traffic-Tred, assures a slip-proof footing on wings when planes are being serviced. It is a perforated-corrugated runner mat made of long-wearing corded rubber. Traffic-Tred runner mat is 7/16 inches thick and is available in rolls 24 inches, 36 inches or 48 inches wide.

For further information and a brochure on this new-type matting, address requests to American Mat Corporation, 2215 Adams St., Toledo 2, Ohio.



RUBBER MAT, *called Traffic Tred, assures safe footing on wings of aircraft*

. . . in the Corporate Hangar

Five Twin-Beech's, owned by Goodyear Tire and Rubber Co., Morrison-Knudsen Company, Inc., Trousdale Construction, MGM Studios and Cantlay and Tanzola, have been in the hangar at AiResearch Aviation Service for hundred-hour inspections. The pilots over-seeing the work were Earl Harmen and Paul McCabe for Goodyear; Bill Evans for Morrison-Knudsen; Bob McDougall for Trousdale; Robert Taylor and Ralph Couser for MGM, and Tom Rafael for Cantlay and Tanzola.

Charles Welstead brought the DC-3 owned by Investors Diversified Services, Inc., of St. Paul, Minn. to Aerodex, Inc., Miami, for minor radio modifications. This DC-3, overhauled and converted by Aerodex in 1950, is said to have one of the most beautiful executive interiors in the country.

The Grumman *Mallard* belonging to C. B. Wrightsman has been in the AiResearch hangar for interior overhaul and a 50-hour inspection. Pilot Frank DeRose brought the aircraft in.

Charlie Baudaux, flying for the Burk Burnett Estate, set down the B-B's *Lodestar* at Southwest Airmotive's ramp to wait out a spell of bad weather before he flew on to his home base at Fort Worth.

One of the Dallas and Mavis Forwarding Company's *Bonanzas* has been at Roscoe Turner Aeronautical for hundred-hour inspection.

Len Mills, pilot of M. H. Whittier Company's Twin-Beech, is now basing the plane at Pacific Airmotive at Burbank. Richfield Oil's new D-18 is based at Bakersfield, but PAC is handling all maintenance. Jim Hyden is Richfield's pilot.

Two of Morrison-Knudsen's DC-3's are in the AiResearch shop for new radio installations and miscellaneous mechanical work. Crews are Don Brady and Ruth Grant, and Wayne Watson and George McKean.

New York Wire Cloth Company has its *Lodestar* back in operation after installation of the new Lear L-5 automatic pilot with approach coupler and altitude control. The autopilot was purchased from Atlantic Aviation at Teterboro, N.J., but installation work was done by Lear, Inc., at Grand Rapids, Mich.

Also back in operation is Bethlehem Steel's *Lodestar*. Chief Pilot Al Junkers and Mechanic Arnold Hayes had the ship at Pacific Airmotive for radio installation and other work.

George Collins, pilot for Louisiana Power and Light's Twin-Beech, has had the company plane at Southwest Airmotive for 1,000-hour check.

Fairbanks, Morse & Co's Lockheed PV-1 was at Aerodex in Miami for minor engine, aircraft and radio repairs. Capt. Jack C. Jones and his copilot, Al Williams, later flew the plane out to Chicago.

R. W. Lane, pilot for the Food Machinery and Chemical Corp., San Jose, Calif., brought the company B-23 to Southwest Airmotive for a check. Lane is his company's Corporation Aircraft Owners Association representative.

John A. DeMarie, Dunn Brothers' pilot, is glad to be back in the air after a serious automobile accident in which he almost lost his life. John claims the accident seems to have improved his flying ability. . . . "But," as he puts it, "am I afraid to climb into a car!"

Marvie Staddon brought Mr. L. B. Smith's executive *Lodestar* to Aerodex for 100-hour inspection and a right engine change.

AiResearch Aviation Service recently completed the installation of executive interiors on two Convair 340's for Arabian American Oil Company. The aircraft are to be used as combination passenger-cargo carriers for delivery of Aramco's own personnel and supplies throughout Africa.

CAOA report

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the members firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. CAOA headquarters are located at 1029 Vermont Ave., N. W. Washington 5, D.C. Phone: National 8-0804.

The Kinorama—A Device for Evaluating Airport Approach Lights

Fog at airports always has constituted a serious hazard to air traffic. Although extensive flight tests have been made to determine which of many proposed approach-light systems is best suited for landing in fog, these tests have thus far failed to bring about agreement on any one system. To supply this need, the National Bureau of Standards, in cooperation with the Navy Bureau of Aeronautics, has developed a device known as the kinorama with which a pilot can evaluate the guidance provided by a system of approach lights without leaving the ground. Perhaps more important in the long range than determining the best approach-light system will be the use of the kinorama in providing pilots with the vital training for landing in fog which can now be acquired only through hazardous experience.

The use of the kinorama makes it possible for the pilot to see an approach-light configuration speeding by him just as he would in flying over it in fog. The course followed in such a simulated flight is determined by the pilot himself, who acts in response to the lights that are visible to him. By recording the paths thus followed, it is possible to obtain objective records reflecting the merits of the light system. While the device is not a substitute for flight testing for the final approval of a system, it is inexpensive, objective, free from hazards, and not dependent upon the occurrence of fog.

In spite of the excellent electronic equipment which has been developed for guiding pilots in fog, safe landings in bad visibility are not yet a common practice because there remains the problem of making the final contact with the runway. Where so much is at stake, it is desirable, if possible, to make this final contact visually rather than to trust the operation of electronic devices. It is the purpose of the approach lights to furnish an earlier visual contact with the ground.

Many engineers and pilots have attempted to design systems of lights to guide pilots in the critical 17 seconds between the time the aircraft is near enough to the ground to be within the reach of lights and the pilot's first sight of the runway lighting. Practically all discussion of the merits of these different systems has revolved about stationary aspects of their designs, such as the interpretation of geometrical figures, the visual range of the lights, and the possibility of seeing lights in different locations. It is quite evident, however, that approach lights cannot be seen in stationary arrangements by pilots except in the unusual cases of fixed balloons and helicopters.

Two devices which incorporate the natural apparent motions of landing aircraft have been developed for the study of approach-light systems. One of these, called the cyclorama, has been used for some time for demonstrations in England. This device, however, is limited to configurations in a single plane and hence cannot be used for evaluating a three-dimensional arrangement of lights such as the slope-line system. The second device, the NBS kinorama, undertakes a more complete simulation than the cyclorama and includes the three-dimensional aspects of approach-light systems.

Evaluation of three different types of visual aids has been undertaken with the kinorama: (1) a comparison of three "overrun" lighting systems designed at Wright-Patterson Air Force Base, utilizing different types of lighting units; (2) a comparison of the three approach-light systems proposed for standardization by the International Civil Aviation Organization; and (3) a study of longitudinal and transverse markings have shown satisfactory agreement with corresponding flight tests. The investigation of the approach-light systems are as yet incomplete; preliminary results obtained with the laboratory kinorama will be supplemented by tests with the prototype model.

In addition to its usefulness for evaluating lighting systems, the kinorama gives promise of being a valuable training device. The use of approach-light systems in good weather does not make a pilot proficient in using them in fog. The irregularity and suddeness with which fogs occur, on the other hand, make it impracticable for a pilot to obtain his training by gradually flying in more and more difficult weather. The kinorama can be used to supplement experience in landings with moderately low ceilings and prepare a pilot for landings in actual fog. This will make it possible for pilots to complete landings with approach lights when the weather has deteriorated and thus obviate the inconvenience of having passengers diverted to alternate landing fields at some distance from their destination.

For more complete details refer to "The Kinorama as an Evaluator in Aviation Lighting", by F. C. Breckenridge, Preprint #21 of the National Technical Conference of the Illuminating Engineering Society, Sept. 8-12, 1952. Abstract published in *Illuminating Engineering*, September 1952.

CAA Reports Curved Airways Possible with Newest Flight Aid

Curved airways, reduced flying time between airports, and bad-weather flying in and out of small airports are all possible with Distance Measuring Equipment, according to a recent report issued by the CAA.

Distance Measuring Equipment, commonly called DME, is one of the newest air navigation devices. Some 400 DME ground stations, called transponders, are presently being installed by the CAA along the airways.

DME works on principles somewhat similar to radar. A transmitter in the aircraft sends out a series of radio pulses. These are received by the ground transponder, which replies with another series of pulses. The equipment in the aircraft, called an interrogator, measures the time required for the "round trip" made by the radio pulses. This is translated automatically into the distance in miles between the aircraft and the transponder. This distance is registered on a dial.

A recent CAA Study, called "DME at Work", describes a series of flight tests and demonstrations which show the advantages DME offers to executive pilots, airline operators, military aviation, and others.

RTCA Publishes "The Air Traffic Story"

A highly valuable document has just been published by the RTCA. It should be in the flight reference library of every corporation pilot. Titled "The Air Traffic Story", it comprehensively covers the various aspects of aviation tele-communications. The document has four sections as follows:

SECTION ONE: The Common System

SECTION TWO: Elements of The Common System (Transition Period)

Note; This section provides excellent coverage of the LF/MF Four Course Radio Range, the VHF Omnirange, the Visual-Aural VHF Range. Fan and Z Markers, Radio Homing and Direction Finding, Distance Measuring Equipment, Course Line Computers, and many other items of interest.

SECTION THREE: How to Use the Common System.

APPENDIX I.—Terminology, U.S. Common System of Air Traffic Control and Navigation.

Copies of this document may be obtained for only 50 cents each. Make checks or money orders payable to "The Radio Technical Commission for Aeronautics." Their address is: 1724 F Street, N.W., Washington 25, D. C.

Misuse of The Phonetic Alphabet

The phonetic alphabet is proving a highly beneficial aid in radio-telephone communications when used for its intended purpose, *i.e.*, clarification of difficult or unfamiliar words or letter groups, especially during adverse communication conditions. However, the CAA has indicated that it is becoming increasingly apparent through pilot comments and field visits by CAA representatives that phonetic equivalents are very frequently

used by facility personnel when circumstances do not warrant their use.

In a great many of the cases noted, it seems that Airways Operations Specialists have grown into the habit of stating common, everyday contractions such as "VFR" and "IFR" in phonetic equivalents (Victor Foxtrot Romeo—India Foxtrot Romeo) whenever they are used in radiotelephone, interphone and teletype communications. The prefix letter "N" and the suffix letters on civil aircraft identifications (N1234H, N6789G) are almost invariably treated in similar manner irrespective of the communication conditions prevailing at the time. The detrimental effect of these widespread practices in terms of circuit congestion due to excessive verbiage should be quite obvious. This is particularly true of the new international phonetic alphabet in which essentially all words are of multi-syllable construction.

It may be that this problem results, at least in part, from a sincere attempt at pilot education on the part of CAA Airways Operations Facility personnel. In any event, it is requested that a conscientious effort be made by all corporation pilots to limit the use of phonetic equivalents on all communications channels, to those occasions when clarification actually appears necessary.

Congress of Civil Aviation Conferences Scheduled for Kansas City

Plans for a Congress of Civil Aviation Conferences are progressing rapidly and all the facilities needed for conducting the affair, to be held March 23 to March 27, have been reserved.

The Congress is sanctioned by 14 national aviation organizations, including CAOA. The purpose is to encourage members of the various organizations to meet as individual groups in Kansas City on the dates indicated in special rooms reserved at the Municipal Auditorium. The agenda of the respective association meetings will be left to each organization. The only joint sessions planned for the Congress will be noon luncheons and a joint program Thursday afternoon, March 23, and a joint banquet Thursday night.

In connection with the Congress, there also will be an exhibition of 50 years of Aviation Progress. A large number of manufacturers, suppliers and distributors already have agreed to exhibit models or pictures of their earliest as well as their latest products.

Although final details have yet to be worked out, it certainly is recommended that this date be placed on your calendar so that this highly interesting and constructive Congress won't be missed.

CAOA has asked the Convention Chairman to set aside Thursday and Friday, March 26-27, for a meeting of CAOA members.

Lear Publishes ADF Station Log

CAOA member Lear, Inc. just recently published a very useful booklet covering the pertinent facts on homing stations which, heretofore, has not been available in a single volume.

Full data on low frequency ranges, control towers, radio beacons and ILS compass locators, all of which provide a usable signal for ADF equipment, is well organized and alphabetically listed by name of town or city. All a pilot has to do is turn to the town he wants to home on and he immediately has a complete picture of all the ADF facilities available in that place. Points covered are: station identification, location, frequency, power, type of antenna, type of facility, distance to nearest adjacent airport, and hours of operation.

The booklet also gives magnetic bearings to the airport nearest to the radio facility as well as describing the special DF characteristics of each type of station mentioned. The latter is of great importance since different types of stations offer signals of varying reliability for ADF use. All of the above information is also available on private radio beacons operated by airlines for their use on off-airways airports, data which heretofore has never been published publicly.

Copies of this booklet may be obtained from any Lear Distributor or by writing directly to Learcal Division, Lear, Inc., 11916 West Pico Blvd., Los Angeles 64, California. The price is $1.00 per copy.

Aviation Noise Reduction Program

The National Aviation Noise Reduction Committee, which was established at the request of the President because of the increase in the number of complaints by the public concerning the noise nuisance effect of aircraft, has been actively engaged in a study of this problem with a view toward reaching an ultimate solution.

Several steps have already been taken to alleviate the noise-nuisance factor. Traffic patterns have been adjusted wherever possible to avoid flying over congested areas. At some airports, application of the preferential runway system has improved the situation. The scheduled air carriers have developed training programs to insure cooperation of their pilots in improving cockpit procedures designed to reduce noise through the proper use of power settings, flaps, etc. It is believed that these programs have resulted in much improvement as evidenced by the public's reaction to such voluntary measures taken by these carriers.

It is believed that corporation pilots are fully aware of the seriousness of the situation, in that the future of the entire aviation industry could be jeopardized by creating a feeling of antagonism or ill will on the part of the general public. However, most people recognize the technical problems faced in connection with the muffling of the sound at its source, and are, therefore, appreciative of any efforts on the part of both industry and government to take intermediate action that will offer some measure of relief.

Pre-Landing Check List Important to Safe Flight Operations

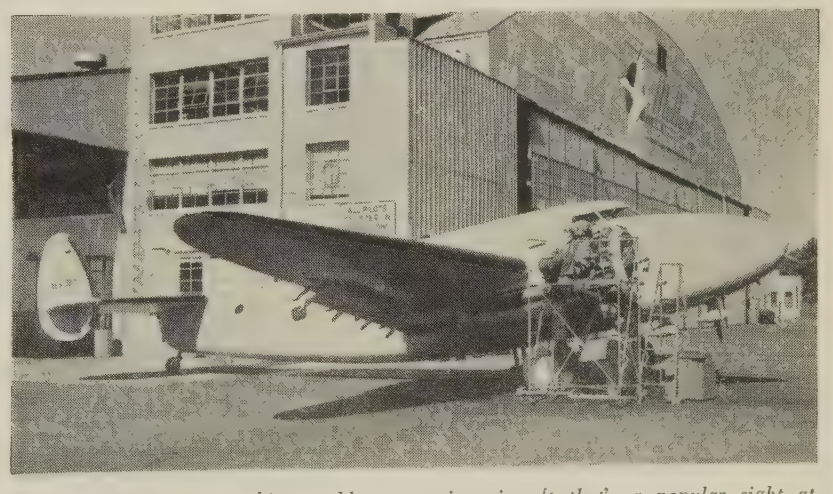
CAOA endorses and recommends the CAA modification of the Pre-Landing Check requirement established for air carrier. This amendment removes the "challenge and response" method for all pre-landing checks except for "*Landing gear—Down and Locked*". A momentary visual check has been substituted so that one pilot may be observing the traffic at all times when approaching for a landing.

All Items, except the Landing Gear, can be readily checked by one pilot calling out the item to be checked and then performing the operation with the other pilot observing the action or making a momentary visual check after the operation is completed. It is important that the Landing Gear still be handled by "Challenge and Response."

"Challenge and Response" remains mandatory on all other check lists.

Dual Radio Facility Charts Helpful to Pilots

Tests have shown that smoother and faster cockpit coordination is attained in training and in routine operations, if both the pilot and copilot have their own radio facility charts. This permits them to keep continuously advised of the radio facilities needed next and avoids reaching back and forth for a single chart.



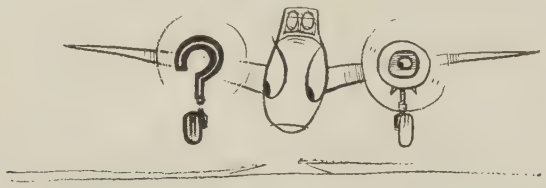
LEAR'S LODESTAR, *a robin-egg blue executive aircraft that's a popular sight at airports from coast to coast, was photographed here undergoing an engine change. Feature of this plane is the Lear-designed experimental engine cowlings for high-speed performance. The plane is equipped with all of Lear's radio navigational equipment and a Sentinel TV set fitted with a safety glass in front of the cathode ray tube as a safety measure for altitude changes. Pilot is Normal Warren; copilot is J. Jay; with Bill Lear himself in the lefthand seat as often as possible*

Performance

from the Files of the Flight Safety Foundation

Caution Exercised

A multi-engine executive plane with pilot, copilot and two passengers aboard took off from Dallas, Texas, bound for Kansas City. Shortly after getting off the ground and at a speed of 95 mph, the pilot noticed vibration on the right side of the aircraft. Judging from previous experience, he took it to be the result of a flat tire. Since he knew there were spares on hand at Tulsa, Oklahoma, he decided to proceed to Tulsa Municipal Airport. By examination of the tires through the cockpit window, it was not possible to determine whether or not the tire actually was flat.



The pilot of the executive plane called the Tulsa Tower and requested emergency equipment to stand by. He then had his two passengers sit in the rear seats and he padded them with blankets. All movable objects were secured, and the door between the cabin and the pilots' compartment was blocked open.

When the Tulsa Tower assured the pilot that all emergency equipment was in place, the crew brought the plane in for a landing. The landing was in a normal three-point attitude except that the right wing was held up as long as possible. After rolling straight down the runway for about 100 yards, the tire turned at right angles, locking the wheel and causing the retract strut to collapse. The wing dropped and the airplane ground-looped and slid sideways for 50 yards. When the aircraft finally came to a stop, both passengers and the crew got out as quickly as possible. However, no fire resulted.

Damage to the airplane included right prop, right flap, landing gear doors, landing gear strut, right wing tip, right outboard section of the aileron, retract strut, tire and tube. But . . . there were no injuries to crew or passengers. All of which proves that caution, clear-thinking and experience can be a life-saving grace in an accident.

Double Check

A businessman landed his airplane at a Municipal Airport, taxied to a parking area in front of a service operator's hangar, and asked the attendant to have his plane gassed up and ready to go by the time he returned from a business appointment. A couple of hours later, the businessman-pilot returned to the field, paid a gas slip, and took off for his return trip home. A short time after take-off, the plane's engine quit and the businessman-pilot had to make an emergency landing. He was not injured but his airplane was severely damaged. Investigation disclosed that there had been two air-

PITFALLS

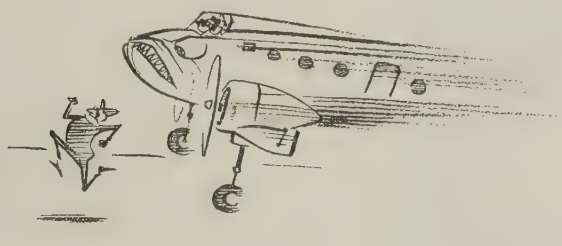
by Jerome Lederer and Robert Osborn

planes of that particular make and model at the field, and the service man had gassed up the wrong ship. In paying his gas bill, the businessman-pilot had not checked the license number of the plane written on the gas slip, and he also had failed to check the tank himself. The first error does not excuse the second, and the moral remains: Check . . . Check . . . and Double Check.

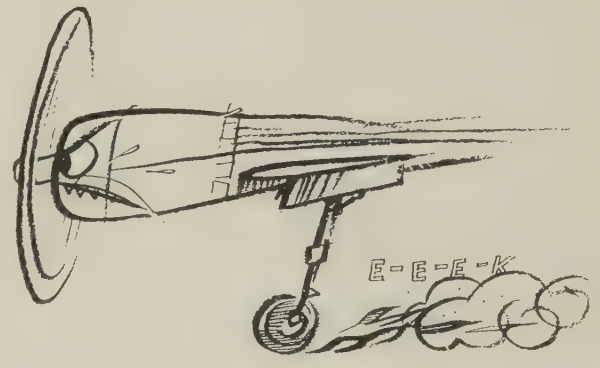
Flight Checks

Check pilots name these acts as frequent taxiing errors occuring on flight checks:

1. Taxiing or turning too fast.



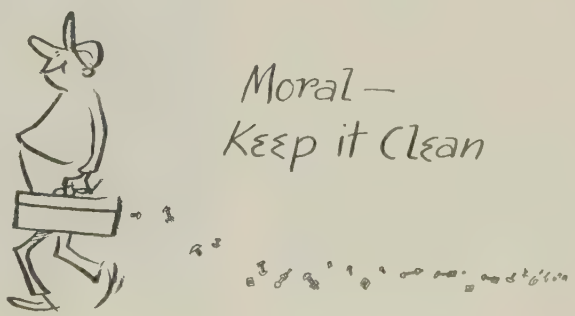
2. Using brakes roughly or excessively in a turn.
3. Using too much power or improperly using power; not coordinating power with brake.
4. Not observing other aircraft or obstructions; concentrating too much on checking inside the cockpit.
5. Not complying with instructions from the tower; taxiing without power clearance.
6. Over-controlling or roughness on nosewheel.
7. Rough handling of equipment and tires; pivoting excessively on one wheel.
8. Taking chances in squeezing through narrow openings; not getting an okay from copilot or ground personnel.
9. Failing to check gyro instruments in turns.
10. Using steering mechanism improperly in turns.
11. Applying brakes and power or excessive rpm simultaneously near obstructions.



Hazard

An aircraft and its crew were lost recently when a small bolt, measuring less than an inch in length and less than half an inch in diameter, jammed the controls. Apparently, the bolt had been dropped by a mechanic working in the cockpit and had fallen through an unprotected gap in the cockpit flooring. It had landed in the chain and sprocket system which actuated the elevators.

On many occasions pilots have reported that bolts, nuts, washers and even wrenches have been left loose in aircraft by maintenance crews.



Planned Maintenance

(*Continued from page 23*)

stocks of maintenance parts in the business. Not just nuts, bolts, tie-rods and gaskets, but enough major components to rebuild the entire airplane without delay. We carry eight complete engines in corrosion-proof "cocoons"—four for the "Lib," one for the *Lodestar*, and three for the Twin-Beeches. Six of these engines are stored and maintained on contract by Pacific Airmotive, at Linden, N. J., and two are stored in Los Angeles on a similar basis.

Except for major engine overhaul, we do every single bit of our maintenance work ourselves. This includes the big major 8,000-hour airframe overhaul, complete reconversions of military planes to company carriers, and just about everything short of actually manufacturing new parts from scratch. We do the same job, naturally, for our clients. Our equipment includes: lathes, sheetmetal equipment, welding, upholstery, woodwork, paint and dope, and engine build-up. We have one of the most complete radio shops in the East, with an expert radio mechanic in charge full-time. Although we naturally keep a large stock of radio parts, we also keep a stock of complete sets. If one of our ships comes in with a radio squawk, we don't swarm in there and fiddle with it for half a day. We just pull the whole set out, put in a brand new one, and send the ship out again in no time at all. Our expert then has plenty of time to overhaul the defect without holding up flight operations.

Incidentally, we've found that it pays to standardize your radio gear if you fly a fleet. We've done it, and it pays off in a smaller parts inventory, greater familiarity with the equipment on the part of pilots and maintenance men, and money and time saved all along the line.

Another gimmick we've found helpful is to check out copilots as A&E mechanics. That way we have control of our maintenance all the time, whether the airplane is in Galveston, Nome, or Morristown. Our own man, who has a real stake in the safe operation of the airplane, has his finger on things on the road. Even though he may not be able to handle the job by himself, he can and does supervise the work of the out-of-town mechanic. This takes the hope and guesswork out of the job.

We run our Morristown shop from 8 to 4:30 on a standard day shift, with a "limited second shift," for turn-around maintenance primarily, from 3:30 to midnight. We keep a man on 24 hours a day as a watchman and to do certain necessary jobs at odd hours.

Frankly, our biggest headache as our planes grow older (and particularly since the outbreak of the Korean war) has been a steady supply of parts. We have close to $100,000 worth on hand, but our policy of using only top-grade brand-new parts means that we discard parts that others might conceivably try to squeeze a little extra life out of. So, when I go on the road with one of our planes, I'm always bird-dogging around, looking for stuff and keeping up my friendship with people who are in a position to put a finger on a part for me if I should need one in a red rush.

For anyone who is setting up a maintenance shop for corporation aircraft, be it Twin-Beech, DC-3, or four-engined aircraft, there are several key maintenance documents—routines we've worked out after quite a few years of trial and error—they should have. They are Radio Inspection, 6 months; 100-Hour Inspection—Electrical; 100-Hour Engine Inspection and Work Check List; Flight Test Report After Maintenance; and 100-Hour Check.

These lists are applicable to any fleet operation, as is, with only minor revisions due to slight differences in types.

We've set up the "Turn-Around Check List, Multi-Engine," this way:

TURN-AROUND CHECK LIST, MULTI-ENGINE AIRCRAFT

NC..... DATE.....

Part One (To be accomplished before leaving Ship)

1. Seat Covers Installed.
2. Aisle Runners Installed.
3. Remove and Clean Coffee, Water and Hot Food Jugs, Trays and Dirty Silver.
4. Check Lavatory for use. Remove Used Food Supplies. Waste Basket Emptied.
5. Flight Reports, Maintenance Sheets and Gas Slips in Order. Cockpit (Maps, Manuals, etc.) In Order.
6. Defects to be cleared before next Flight—
   - A. .....
   - B. .....
   - C. .....
   - D. .....
   - E. .....

COWLS *are opened and accessory section of each engine checked after each flight*

Part Two (To be done before next Ship)

1. Oil Added RE.....qts.
   LE.....qts.
2. Gear and Nacelles wiped down.
3. Brakes Carbon-tet.
4. Airplane Clean.
5. Windows Clean.
6. Nose Compartment—
   1. Tool Kits Checked.
   2. Polish—1 Never Dull, 1 Glass Wax, 1 Klad Wax.
   3. Rags—4 Polish—10 Wiping.
   4. Wing and Engine Covers (Winter Only).
   5. Hot Food Jug.
   6. Coveralls—1 Pair.
7. Cockpit—
   1. Jeppeson Manuals brought to Date and Installed.
   2. Maps brought to Date and Installed.
   3. Flight Information Manuals, Airman's Guide, Flight Plan Pads, Computer, H/P Calculator and Plotter to Date and Installed.
   4. Chamois and Rags (4) Clean and Installed.
   5. Tools Checked and in Place.
   6. Flashlights Checked and Installed.
   7. Spare Bulbs and Fuses Checked and Installed.
   8. Oxygen Checked.
   9. Alcohol Checked (Winter Only)
   10. Auxiliary Radio Checked.
8. Cabin—
   1. Cups (10 each Holder) Installed.
   2. Top Cup—RH Sugar—LH 6 Plastic Spoons.
   3. Step
      Under Tray, Proper Napkins, Tray Clean and Installed.
   4. Waste Basket Clean and Installed.
   5. Two Forward Seat Pockets Clean and Current Magazines Only.
   6. RH Rear Seat Pocket Clean and Company Manual, Maintenance Manual, and Operations Manual Installed.
   7. LH Rear Seat Pocket Clean and Credit Cards, Whisk Broom, Two Decks Playing Cards Installed.
   8. Urp Cups Installed under seat.
   9. Pyrene Extinguisher Full and Installed.
9. Rear Compartment—
   1. Blanket Shelf:
      1. 4 Clean Blankets.
      2. 4 Pillows—Clean Pillow Cases.
      3. 4 Spare Seat Caps.
      4. 2 1-Gallon Cans Prop Alcohol (Winter Only).
   2. Food Cupboard—Clean.
   3. Supply Cupboard:

1. 4½ Cartons Clean Cups.
2. 2 Oxygen Masks in Containers.
3. 15 Plastic Spoons in Container.
4. Silver Service for 6—Clean and in Container.
5. 1 Container extra Sugar.
6. Spare Flashlight Batteries (2), Aspirin (1), Bromo Seltzer (1).
7. Atlas (1), Computer (1), Plotter (1).

4. Map Case:
   1. Spare Maintenance and Flight Reports (2 each).
5. Miscellaneous:
   1. Lavatory Clean—Bucket Installed.
   2. Toilet Tissue
   3. Food Trays (4) Clean and Installed.
   4. CO_2 Extinguisher Installed.
   5. First Aid Kit Checked and Installed.

10. Cleaning—
    1. Ash Trays Cleaned
    2. Interior Windows Cleaned.
    3. Clean and Wax Cockpit Floor.
    4. Clean and Wax Rear Compartment Floor.
    5. Curtains and Upholstery Clean.
    6. Seat Covers Removed, Seats and Seat Belts Clean.
    7. Vacuum and Carbon-tet Rug and Mat.
    8. Seat Caps Clean.
    9. Coast Rack In Order.
    10. Ladder Installed and Clean.
11. Water Jug Filled and Installed—Coffee Jug Aboard.
12. Coffee and Food Added (If Necessary).
13. Fuel Added.....Gallons.

ACCEPTED FOR FLIGHT

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We keep a complete file on all engineering changes and service bulletins—always up to the minute—on all our planes and component parts thereof. We keep a fully documented file on each ship from the time it was made, so that we know exactly what was done to it and when. We keep a library containing every detail we feel will be useful to the efficient and safe operation of our aircraft: CAA airworthiness directives and bulletins, maintenance manuals issued by the manufacturer, complete parts catalogs, CAA engine listings.

I'm a little proud of our record of maintenance over the years. Never once, in some 10,400,000 passenger miles, have we failed a flight due to maintenance deficiencies. Never once have we had a serious, or even a minor mishap. The old slogan "Safety is no accident" applies more to maintenance than to any other phase of operations. We at Continental don't think maintenance is dull. We think it's the most exciting and important phase of flying. We like it.

Product Promotion

(*Continued from page 13*)

and Toronto to pick up top executives of the two Canadian sponsors and of several pharmaceutical industries before heading west to Winnipeg, official starting point of the tour.

The decision to make the trip by air, rather than by surface transportation, put the time-distance factor into proper perspective and gave the touring officials a flexibility in scheduling they could not have enjoyed if they had geared themselves to a rigid timetable. It also took the tour out of the routine pattern of sales junkets and gave it the novelty the sponsors needed to attract newspaper coverage. It was made more newsworthy when the planners back in Montreal voted to make the airplane available to business representatives and their families for sight-seeing flights over each community.

More than 1500 men, women and children boarded the Bristoliner II during the tour, each planeload of passengers making a half-hour swing over a city with Pilot Flannery. The only slightly commercial aspect of each sight-seeing trip was that each passenger received a bottle of hand lotion, a tube of toothpaste or a Rubberset tooth brush as he stepped from the plane.

In the larger cities, such as Winnipeg, Regina, Vancouver and Edmonton, daily newspapers ran group pictures of local drug store personnel and their families in front of the plane. Radio stations sent reporters aloft to record interviews or to pipe live interviews into their studios.

For the benefit of those who may want to follow the B-M lead and take to the air, it should be pointed out that planning is the key to the success of such trips. And it is important to plan carefully the events which produce newspaper and radio coverage.

The air tour arrived at Calgary during the annual Stampede celebration and, by prearrangement, the Do-si-ettes from the Lacolme Orphanage were taken for a ride over the city. The Do-si-ettes, boys and girls ranging in age from five to eight, are noted for their square dancing and were star performers during the Stampede celebration. As in Vancouver, the newspaper in Calgary ran a photograph of the Do-si-ettes beside the Bristoliner II, plus a story on the sales promotion and good will tour.

But Bristol-Myers and Rubberset executives never lost sight of the major objective of the trip—business. At every community they sponsored a reception or a dinner for the purpose of discussing mutual problems with their retailers and wholesalers. The mayor, members of his staff and provincial officials usually were invited to these functions.

An air of informality marked all of the receptions and dinners, and executives representing Bristol-Myers, Rubberset Company and the pharmaceutical companies were able to sit down and discuss across tables marketing and distribution problems, advertising and promotion, and local business conditions.

H. Jay Ronalds, president of Bristol-Myers Canadian advertising agency and a key man in the planning of special events for the flight, summed up the trip this way:

"The trip proved the practicability of using a private aircraft to cover terrific mileage in a limited amount of time and to take a sufficient number of executives of the company to meet the trade."

The Bristol-Myers Company is an old hand at using the executive-type airplane as a business tool. Its first airplane, Bristoliner I, was a twin-engine Beechcraft which did yeoman service until the company's requirements dictated purchase of a larger aircraft.

Bristoliner II was delivered in September, 1951, and has been in almost daily use since that time. In its first full year of operations, the airplane traveled 595,000 passenger-miles and was in the air 775 hours. Those figures are well above the national average (600 hours) for corporate aircraft. Costs are not available on the Bristoliner II, but its high utilization produces an hourly cost figure that is comfortably low.

Stanley F. Bloyer, Bristol-Myers chief engineer in Hillside, N. J., and a former pilot, keeps tabs on the airplane for the company and he is responsible for the excellent maintenance and overhaul program established for Bristoliner II. Bristol-Myers uses the Douglas one, two, three inspection system and was one of the first corporations to introduce it. While most executive-type planes are placed on a schedule of 100 and 500-hour inspections, Bristol-Myers adheres to the commercial airline method of opening up the airplane at 40, 80 and 120-hour intervals. The company employs Fred Parker, former airline mechanic, to handle all work on the plane.

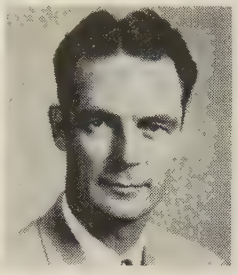
Because the Bristoliner II provides the fastest and most convenient transportation available and saves time, it is used up to the hilt. Soon after the Canadian tour, it was returned to its base at Teterboro, inspected thoroughly and then placed into service to shuttle officials of the company to and from a series of drug conventions in the U. S.

The seating arrangement in the aircraft places four reclining chairs around a conference table in the forward cabin area, four reclining-swiveling chairs in the center section and two fixed three-seat chairs against the walls in the tail section. The interior color scheme utilizes tan, green and brown in colorful combinations.

Pilot Flannery entered the Air Force the day after Pearl Harbor was bombed in 1941, and was commissioned early in 1943. He served as a flight instructor and then was assigned to the China-India wing of the Air Transport Command to fly the "Hump." He came out of the Air Force a captain in 1945 and flew non-scheduled and ferry assignments in England, South America and Asia before joining Bristol-Myers. His copilot, William Abbott, was a White Plains, N. Y., newspaper man, an employee of Wright Aeronautical Corporation, and operator of a flying service in North Carolina before joining Bristol-Myers.

Cessna Celebrates the "Golden Year of Flying" With Its

Greatest Achievement in



A STATEMENT
FROM
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(PRESIDENT, CESSNA AIRCRAFT CO.)
About a Fast, Modern, All-Metal Airplane—Priced for Small Businesses as well as Large.

"Cessna's history extends through forty-two of flying's fifty years. And through it all, we have had just one dream . . . one aim . . .

"*. . . to make flying so safe—so easy—so comfortable and convenient that the business airplane would become as useful and accepted as the business automobile.*

"We've made great progress in this. Today, the Cessna 170 is America's largest-selling personal and company airplane and Cessna 170 and 190 Series airplanes are being used by thousands of ordinary

ALL-NEW SILHOUETTE—from the spinner on nose to the new "square" tail design which was adapted from Jet aircraft. This tail assembly increases speed by eliminating trim tabs and reducing "drag." One of the secrets of the "Golden Year" 180's speed and fine flight characteristics is its exceptional aerodynamic cleanliness!

CONTROLLABLE ALL-METAL, CONSTANT-SPEED PROPELLER... 225 h. p. Continental engine—help give this plane a cruising speed of well over 150 m. p. h.... a range of 750 miles.

New "Golden Year" Cessna 180

Airplanes for Business!

usinessmen—not as playthings—but as practical, rofitable, everyday business tools.

Now—for flying's 50th Anniversary—we are ready ith the greatest business airplane of them all . . . ie new "Golden Year" Cessna 180!

While I've been proud of other Cessna airplanes— m so proud of this one that I want to emphasize ree things about it personally.

First—SPEED! We have achieved in a relatively low-priced airplane a cruising speed of OVER 150 M.P.H.

"Second—PRICE! The new 180 sells for $12,950 . . . close to ONE-THIRD LESS than any other make of airplane in the over 150 m.p.h. class!

"And third—LANDING, TAKE-OFF AND FLYING CHARACTERISTICS! They are outstanding. It's the finest engineered piece of flying equipment ever rolled out of the door here at Cessna. Easy to fly and to operate out of large fields and small."

CESSNA "PARA-LIFT" FLAPS—reduce landing speeds a good 10%—shorten take-offs. Make small field landings safe and practical. And Cessna's famous Safety Landing Gear smooths out rough fields.

XURIOUS CABIN with lots of room for four. Beautiful holstery. Smart instrument panel with controlled light-g. Efficient heating and ventilating system — for perfect mfort at all altitudes, in all seasons.

Also See

THE "GOLDEN YEAR" CESSNA 170—America's largest-selling private plane made new and better than ever. Lowest-priced all-metal, 4-place plane on the market . . . by several thousand dollars.

THE CESSNA 190 SERIES; Luxurious 4-5 place executive planes. America's greatest bargains in business transportation.

Look in the Classified Telephone book for the name of your nearest Cessna dealer . . . or write:

CESSNA AIRCRAFT COMPANY
DEPT. SM-2,
WICHITA, KANSAS

ver 150 M.P.H. Cruising Speed

Skyways Round Table

(*Continued from page 27*)

department had to issue an E. O. to change over from this accessory to another, all of which meant quite a money outlay for us. After going to all the distributors around the country, trying to locate this particular part, and to the manufacturer, too, we finally gave up. But at long last we phoned one airline and found it had quite a few of these parts on hand and we were able to buy some from them. Those parts, incidentally, had been on order with the manufacturer for over a year!

"A few days later the distributor called us back and asked how many of the items we wanted. He said that he was expecting delivery of some that week. I asked the distributor how long he'd had the parts on order, and he said, 'Ninety days.' Well, we'd had them on order from that same manufacturer for more than a year! The distributor with his 90-day order gets the parts and we don't. I wish the manufacturer would think that one over very thoroughly, because on our new equipment, we've eliminated his particular items.

"As to purchasing through distributors, we've had that on trial with two distributors for about a year now, and we've been unable to reduce our inventory because the distributor is generally afraid of obsolescence. That's the point Mr. Davis brought out and we'll go along with him on it.

"In my 17 years with Delta, we've run seven types of equipment and we're now operating our eighth. This is probably true with other airlines, too. With a $100,000,000 inventory, I'd say that a 10% obsolescence is very small. In fact, we don't think the distributor can stand up under that sort of obsolescence."

Bevo Howard: *"You, Tom and Archie touched on the unavailability of parts due to upsurges in usage. When a part is not available, is it because it's nonexistent or is it that you just don't know where to locate it?"*

H. D. Wigley: "In most cases, Bevo, I'd say the unavailability of parts is due to a lack of planning on the part of the manufacturers. A good example is the serious trouble we got into over crankshafts and main cases for aircraft engines. We were practically grounding planes every day, and it finally reached a point where we went to the manufacturer and asked him to please quit delivering complete engines and instead give us parts to keep the engines going that we had."

Bevo Howard: *"Having heard the case of the airline operators, let's see what the distributors have to say. Bob Kenty, what is your thinking on this?"*

R. B. Kenty *(Vice Pres. Air Associates, Inc.):* "We distributors feel that many of the airlines' problems can be solved if the airlines will place their confidence in us to do a job of supplying their parts. Mr. Wigley mentioned that he'd like to have one source for all parts. We distributors claim that supplying parts is one of the services we perform. Most distributors represent 40 or 50 major manufacturers of parts and accessories, and it's our job to keep those parts and accessories distributed around the country so that they are available to whomever needs them.

"Another thing is this matter of obsolescence. Here again we feel the distributor can be of service because it is his responsibility to keep those materials on hand. If there is any obsolescence, it's our responsibility. Many of us have very complete IBM stock-recording systems, and we review our slow-moving items not once a year but four times a year. For that reason, we feel that we're a little more expert at controlling inventories. After all, that's our sole business—merchandising, controlling inventories, selling and all those things that go with it.

"When we're stuck with an obsolete item, we have ways and means of going out and getting rid of it; whereas an airline's job is basically running an airline—they're not in the parts-distribution business. With all due respect to the efficiency of the airlines, we do have certain fields in which we specialize, and we feel the distributors do a little better than the customer might do in controlling inventories, handling obsolescence and disposing of surplus, because our livelihood depends on it."

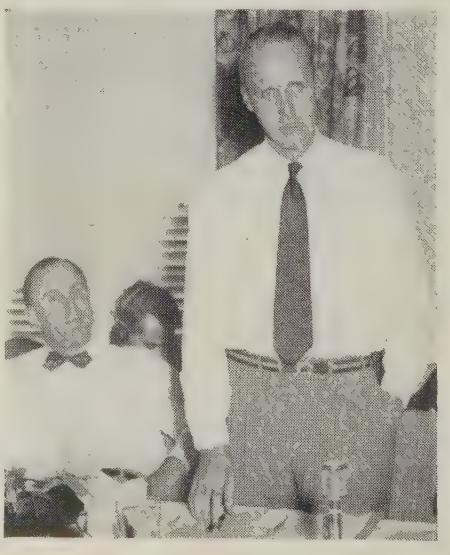
Bevo Howard: *"If it's not a trade secret, Bob, I'd be interested in knowing what you figure is normal obsolescence."*

R. B. Kenty: "I can give you a specific example which concerns our own Dallas branch. Some months ago, September 30, to be exact, I wrote off 1% to obsolescence. That, by the way, is very representative of other distributors. I might add that we do not handle engine parts or accessories."

Bevo Howard: *"Mr. Wigley, did you want to add something?"*

H. D. Wigley: "I'd like to mention one item here that, in Bob's case, I'd say is unique in that the percentage of the type of merchandise his company sells to us represents about 10% of our inventory which is not peculiar to one type of airplane—hardware and such.

"Their types of inventory amount to about $12,000,000 in airline inventories which is slightly above 10% of our $100,000,000 inventory. That's material that never becomes obsolete to us because we carry over from one type of airplane to another."



"IMPRESSIVE FACT," *said Bevo Howard, "is that airlines have $100,000,000 in parts"*

A. S. Galbraith: "I don't believe any of the remarks we make here can be applied across the board. There are many differences in the policies of distributors as well as manufacturers, and there are also differences in the policies and problems of the airlines. We have had situations similar to those that Wigley mentioned, but the tempo of our business is such that we don't know and can't know sufficiently far in advance to accurately anticipate our needs when faced with the long lead times applying to some types of equipment. Particularly in the airframe category, we are faced with a heavy insurance item problem. We're inclined to feel better off if a quantity of insurance items and a quantity of stock is in one place and available to all, rather than distributed over many points where we might have difficulty in quickly locating them."

Bevo Howard: *"I think one of the most impressive things that has come out here today is the fact that the airlines have approximately $100,000,000 invested in parts and supplies, the majority of which are concentrated at 25 different points.*

"Paul Kennedy of Southwest Airmotive, what has been your experience?"

Paul A. Kennedy *(Secy & Sales Mgr., Southwest Airmotive):* "We've been in the business of selling accessory parts to many airlines for over five years now, and from our viewpoint we have not experienced the troubles Mr. Wigley refers to. I don't think we've had many shortages or emergencies, and the ones we've had have been handled properly.

"On the subject of inventory reduction, we have been able to move considerable stock from one airline's shelves to another's. However, we do find it generally true that the airlines maintain their usual heavy inventory policy even on lines that are being furnished by a stocking distributor. After a distributor proves he is capable of furnishing parts to an airline from a planned inventory, then we think that it is the airline's move to reduce inventory accordingly.

"It's very difficult to point out an actual reduction of inventory in an airline directly traceable to a distributor's service, because of the many complex factors in the make-up of their financial statements. However, Horace Bolding, Director of Procurement, Braniff Airways, who was very skeptical of our abilities along these lines at first, has told us that he very definitely can point out an inventory reduction on the lines that we sell to them directly, as a result of our service.

"Mr. Wigley, I know that you have a lot

of parts problems, but I believe that if you really search the situation out you'll find that with the distributors that are capable and with whom you work closely, you don't have too many problems with parts. Southwest Airmotive Co. has been furnishing Stromberg parts to Delta for about three years, and I can't recall over two or three emergencies during that period of time.

"Mr. Wigley has mentioned a couple of instances where Delta has found itself in trouble because certain factories were unable to meet Delta's parts emergencies. One case was engine parts and the other, accessories.

"Horace, you're probably having trouble with parts and units which are manuafactured by concerns that do not have a distribution system available to the airlines. Many of the accessory manuafacturers and both the large engine manufacturers are in that category.

"You should only purchase your parts through a distributor if he can give you service and save you money. Our experience over the past six years has proved that this is not only possible but that it is a reality with the dozen or so airlines that we serve."

A. S. Galbraith: "We have conducted an experiment along those lines with Airwork Corp., in Miami, in connection with Bendix, and similarly our Pacific Division with Pacific Airmotive in California. I'm not able to speak for the Pacific Division's success, but I do feel the results have been very favorable in the case of Airwork.

"At the time we started this, we had an average inventory of Stromberg parts in the neighborhood of six months or better, and we've been working toward a 60-day level and making progress in that direction. Right now, it's somewhere in the vicinity of a 90-day stock of parts. Perhaps much of the success has to do with the proximity of the distributor."

Bevo Howard: *"Dan Tilden, will you speak for your company, the Eclipse-Pioneer Division of Bendix Aviation?"*

Dan S. Tilden *(Service Mgr., Eclipse-Pioneer):* "Eclipse-Pioneer has had a great problem during the past two-and-a-half years. Maybe we've stepped up to the demands of the military more than some other corporations, and perhaps we've spread ourselves a bit thinner than anybody else. In any event, we very definitely realize the effects of expansion in meeting the requirements of the government. We have increased our engineering, production and other personnel and have had to build new plants and establish many new sub-contractors.

"This has all affected our output in certain items and has adversely reflected upon our ability to service the customers.

"Some of the discussion here may lead you to believe that the accessory equipment manufacturers don't have a policy to forecast the stock requirements of the airlines. Our division, Eclipse-Pioneer, has a very definite policy and it isn't new.

"We have a very definite policy of releasing and stocking in anticipation of all commercial parts and unit requirements. We have a very large inventory and a very large commitment for additional inventory. Our commitment has been based upon and extended to combat the present condition of procurement of raw materials, expansion of military needs, etc.

"We have extended ourselves some 400% over pre-Korea days in an effort to render better service to the commercial operators. We realize we haven't been as successful as desired, and many steps are being taken right now in an effort to correct it.

"There are many problems in trying to satisfy our customers today. I feel certain that we know what our customers' needs are and we are fully conscious of the fact that inventory is a great problem. However, it is also a problem with the manufacturer, and if you think a manufacturer doesn't have inventory problems, you'd better go out and take a walk around the block and see how the other half lives.

"Bob Kenty mentioned obsolescence, but I don't think obsolescence is as great a problem as some of the airlines and certain distributors think it is.

"Take the case of the DC-3. Verbally, this airplane was scrapped 10 years ago. Many thought it was headed for the junk

(*Continued on page 40*)

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Skyways Round Table

(*Continued from page 39*)

pile. But even though some of the airlines have replaced it with newer and more modern postwar aircraft, other airlines and corporate owners have and will be operating it for years. The support of parts for this aircraft has been of concern to our people, and we are convinced that the DC-3 isn't going to die tomorrow. We're still supplying parts for it.

"We haven't scratched the surface in the distribution of parts to all commercial customers, including the scheduled airlines. We're studying the situation; we know what the experiences of the other Bendix divisions have been, and we know something of the experiences of other manufacturers and their different methods of distribution. We will adopt the most favorable policy in the future to satisfy the ultimate user and to improve our service to all concerned.

"One of the main difficulties is the availability of the right part at the right time, even though the airline or the user has been unable to predict requirements. It's been said here today that it is impossible for the airlines to predict their requirements sufficiently far in advance to meet the necessary lead time the manufacturers are requiring today. I've had considerable experience in operating or participating in the operation of an airline and I've had to forecast requirements. I also have experience in distribution as well as in manufacturing. It definitely is a problem to forecast requirements, but it's a two-fold deal. The user has to work with the supplier so that the supplier can give the user what he wants when he wants it. I don't think the user should sit back and criticize the distributor or the manufacturer for not predicting correctly when he can't do it himself.

There has been a material amount of progress made, especially as far as the airlines are concerned, in recent years in their effort to standardize on accessories and instrumentation in the aircraft used by the different airlines. The economy in that is very apparent.

"We at Eclipse-Pioneer realize that improved service is necessary, and within a short time our service to commercial customers is going to show improvement."

Bevo Howard: "*Mr Trees, would you enlighten us some more?*"

L. W. Trees *(Service Mgr., Scintilla Magneto Div., Bendix Aviation):* "We probably do not have as many types of equipment or products as some other manufacturers, and that, perhaps, is in our favor. It appears, however, that there might be a need in the department where requisitions originate and where they can see what is happening to the equipment, to integrate their present usage with the indicated increase in operation requirements resulting from adding new planes to the fleet. If they will project their use-experience against time, and use that information in their requisitioning, they will come up with a better quantity-estimate.

"In our own case, for many years we have been releasing material eight or nine months ahead of any requirements we have. We do it on what we call a 'use-expected' basis to determine material releases within the present limits of Material Control.

"The main thing I would suggest the airlines do is this: if they are getting new equipment, they should instruct their people who study usages to watch the rate at which the use-index indicates spares requirements will increase. It will come up for a time and then level off.

"As far as our distributors are concerned, I think they can give considerable service to the airlines and can help reduce their inventories. We caution our distributors to be sure to make a usage study by going into the airlines' usage figures and setting up a target date for starting delivery."

Bevo Howard: "*Tom Wolfe of Pacific Airmotive came all the way from the West Coast to take part in this discussion. Tom, I'm sure your remarks will be invaluable.*"

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Ain't it the Truth

Woman's work is never done. There is always some man who does not respond improperly.

* *

Sadie the Stewardess thinks that a detergent is a sort of anti-perfume . . . something that keeps a boy from being himself. She doesn't think it will prove popular.

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆

Tom Wolfe *(Pres., Pacific Airmotive):* "I think this subject is a matter of concern to all manufacturers, operators, and distributors in the aircraft industry. I happen to be in the position of having spent many years with air carriers and have experienced first-hand their problems relating to inventories as well as acting as a distributor at the present time in selling to the airlines.

"There is no question but what air carriers can save a substantial amount of money by dealing through distributors on a large proportion of their requirements. It only stands to reason that an air carrier cannot accurately provision for all of its requirements without acquiring excessive inventories. The distributor is in the same position, but inasmuch as he has many customers drawing upon his inventories, he stands a better chance of getting out from under an overload by virtue of his many customers; whereas, if he had but one customer, this would be difficult.

"One experience I had while with Pan American taught me a great lesson in this regard, and I'm sure Pan American has since found out that considerable economy can be effected by going through distributors for a portion of their requirements.

"This 10% figure which has been mentioned is a little puzzling. About seven or eight months ago we made a run-down on excessive inventories, which figured about $25 million for the air carriers. While a lot of this excess was due to shifting of equipment and requirements, a very substantial portion was due to attempting to provision for everything in the book. If the carriers had placed a portion of the business through distributors, this figure would have been materially reduced and the net cost to the carrier would have been far less.

"There is another question which should be noted at this point. We recently had an experience where we were provisioning for a customer based upon a usage factor. The inventories we acquired specifically for this customer in connection with his peculiar requirements caused us to accumulate several hundred thousand dollars worth of material. This particular customer then decided to shop around and distribute his buying among several sources. All this without any notice to us as his distributor. The result was—we were finally stuck with $40,000 in inventory peculiar to his account. Needless to say, neither the customer nor the distributor gained, and the net result was a very disturbing situation. In other words, to make a program of this kind of work, the customer and the distributor must have the utmost confidence in each other and stick to some basic practices.

"In many instances at the present time, due to the long lead time in ordering, our customers guarantee an inventory which is ordered specifically for them. This has eased the tension a great deal and is working perfectly, because it insures the carrier that materials will be on hand when required; and yet at the same time, if there should be excesses in certain categories which were unpredictable, the materials can be released for sale to other customers, and there's no loss to anyone."

Bevo Howard: "*George Jalonick, what do you think can be done to help solve this parts problem?*"

George W. Jalonick III *(Vice Pres., Southwest Airmotive):* "We have what we think may be one of the answers. We send our men into each of the airline installations to study its usages: past, present and their forecast usages. These men also study the airlines' inventories and examine the orders they have with the manufacturers. With all this information, we try to forecast our needs, based on the delivery dates the manufacturers have given us, so that we can be certain of having merchandise on our shelves 90 days in advance of the airlines' anticipated need for these parts. Even if an airline needs a part ahead of schedule, we have the 90-day lead so that we should be able to give it off-the-shelf delivery.

"Here's another feature we feel is successful: where we find an airline having an excess of one item, and another needing that item, we take the item out of the airline that has it in excess and put it into the inventory

(*Continued on page 42*)

Collins salutes the CONVAIR 340—one of the most outstanding contributions ever made available to the airlines industry. The CONVAIR 340, designed for maximum speed, economy and efficiency is equipped with one of Collins "standard complements" of Navigation and Communications equipment in keeping with its position in modern air transportation. The Collins-Convair "package" consists of: • The 51V Glide Slope Receiver • 51R ILS Omni-Range Receiver • 18S-4 Communications Transceiver • 180K-3 Antenna Tuner • 17L-3 180 Channel Transmitter and • The 37R, 37P and 37J Antennaes.

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Skyways Round Table

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of the airline that needs it.

"I was surprised at the statement made by one of the airline men that he had not been able to reduce his inventory by buying through a distributor. I can't help but believe there must be some internal mix-up there, because I think we've been able to supply him off-the-shelf delivery of the parts we've been furnishing him. If it's our fault, we'd like to know about it.

"Our obsolescence this year has been very small because we have been very inventory-conscious. I think we've had adequate inventory to give our customers off-the-shelf delivery in most instances. Of course, it isn't always possible to have everything everybody wants when they want it."

Bevo Howard: "*I'd like to ask Mr. Gaillard of the CAA to comment on this subject.*"

G. R. Gaillard *(Director, Office of Aviation Defense Requirements, CAA):* "As you know, our office is deeply concerned with the problem of adequate supplies for air transportation. However, I don't want to appear to be taking sides on the advantages and disadvantages of sales through a manufacturer's distributor as against direct sales to the customers. We are often involved, though, when an airline has trouble getting spare parts to keep its fleet operative, and so comes to us for emergency or priority assistance. We've been in the middle of the argument and have heard both sides. The manufacturer blames the airline for not ordering early enough, and the airline claims the manufacturer does not maintain a sufficient inventory to take care of his needs, as is his duty.

"I would like, however, to point out that 95% of the trouble can be traced directly to too many defense orders. Without exception, the manufacturers we've talked to realize that in the long run the civil users are their staple and best customers, even though they represent only a small portion of their present production. The manufacturers are most interested in taking care of their old customers, but in every case we've found that military contracts have so fouled up their order boards and bound them up with military requirements that they've lost their flexibility to give the service deserved.

"I feel that as soon as the military situation levels off, the suppliers will be in a position to give better service."

Bevo Howard: "*Earle Scott, you said you had a point to make.*"

Earle M. Scott *(Pres., Scott Aviation Corp.):*

"Our company has developed a system to assure better deliveries to the airlines and thereby reduce the necessity of their carrying high inventories of our equipment. We carefully watch airplane manufacturing schedules. For instance, when we know that Pan American is going to get a *Constellation* per month, we anticipate Pan Am's orders a month before delivery of the aircraft and we try to have oxygen equipment in process in our plant in anticipation of their orders. This method has enabled us to reduce lead time from a former 90 days to 30 days."

Bevo Howard: "*Let's jump over into the parliamentary effectiveness of corporate aircraft. Jean DuBuque, would you comment briefly on some of the problems of parts distribution from the standpoint of the corporate aircraft?*"

Jean H. DuBuque *(Executive Director, CAOA):* "There have been amazing developments in corporation flying during the past five years, particularly in the use of multi-engine aircraft. When you consider the fact that corporate aircraft flew approximately 3,000,000 hours in 1951 and that this figure may have been exceeded in 1952, you can readily understand why there will be a growing need for parts and accessories for corporate aircraft. The yearly utilization of corporate aircraft has been running anywhere from 350 hours to 1,000 hours, with an average of 596 hours. Naturally, parts will wear out on aircraft with such a high degree of use.

"Recently, we made a spot check of some of our top corporate members who operate large fleets of aircraft, to determine the parts situation. In most instances, we found that they had stock-piled enough parts to last them for several months. In other instances, however, members were running into difficulty securing parts, particularly because of the long lead time given them by the manufacturers and the fact that many distributors were unable to provide or obtain the type of parts needed.

"One of our members in the southwest found it so difficult to secure DC-3 parts that he established his own supply organization and has men scouring the country for parts for his and other corporate DC-3's.

"It's possible that corporation flying within the next five years may practically double itself, and the need for parts will become increasingly acute. Presently, there are about 255 DC-3's being operated in the corporate fleet, and in view of the fact that no manufacturer has as yet produced an ideal type of aircraft for corporate flying, it is understandable that corporate owners will continue to use DC-3 equipment as well as other types of multi-engine aircraft in the foreseeable future. Since a sizeable investment has been made in the conversion of multi-engine aircraft for executive use, there will be no mad scramble for new aircraft as long as present ones perform satisfactorily.

"Perhaps one solution to this problem would be a survey of corporations using DC-3 aircraft to determine their present needs and their estimated future needs, so that this information can be passed along to the various manufacturers and distributors. They, in turn, could offer a possible solution to the matter. I have no way now of estimating the current parts requirements for corporate aircraft operators. As the months go by, the situation undoubtedly will become increasingly difficult. That, along with the shortages of DC-3 parts now being experienced, could well bring on a mad scramble with a resultant build-up of prices."

Bevo Howard: "*Mr. Hine, you and Airwork have done a great deal of work for corporate owners. Would you care to comment?*"

Francis L. Hine *(Pres., Airwork Corp.):* "I'd like to inject a little preamble here, Bevo. We're relative newcomers to the industry, having been a part of it for just five years. When we started, I don't think there was such a thing as distribution in the aviation industry. There existed only an assortment of unstable brokers operating out of briefcases. In the past three or four years, organizations that are financially sound have been set up to handle parts distribution. But I don't think the time will ever come when anybody is going to tell a corporation or an airline to buy from a distributor. The distributor has to sell himself, his services and his ability to supply.

"There's no great difference between some of the larger corporation-aircraft owners and the airlines. Two corporation customers of ours are as large as our largest airline customer. However, we don't overhaul all of that airline's engines. One of the scheduled airlines that we do work for has a requirement of an engine and a half overhaul a month; our largest corporation customer has an overhaul quota of 12 to 17 engines per month. So I think the airline and the corporation problem are one and the same.

"Jean DuBuque mentioned something about the difficulty of supplying parts. That sort of amazed me. We've only experienced that trouble in a few instances: once where a corporation operated a very diversified fleet of aircraft; and the other where a corporation operated an obsolete model engine. They dropped in on us out of the blue and needed a Pratt & Whitney part that hadn't been on the market for 10 years. They raised the very devil with us because we didn't have it. But I think those instances are the exception rather than the rule.

"I don't know about airplane parts, but as far as engine parts are concerned and from

"**SCRAMBLE** *for parts," explained Jean DuBuque, "causes a build-up in parts prices"*

the distributor's point of view, the corporation aircraft is given very serious attention. I think we are all cognizant of the corporate field's tremendous growth and the market there. We try to give as good service to corporations as we do to airlines."

Bevo Howard: "*As a fixed base operator myself, I'd like to make this observation: that the corporate owners should ask their aviation department managers to deal through distributors. They should be encouraged in that direction at every opportunity for two reasons: one, to strengthen the fixed base operator and the distributor, which is good for the Industry; and two, in the long run it will do much to keep the corporate operator's expenses down, so that when business conditions change, the top executives of the company will not have to look at a high-cost operation and start thinking about eliminating the entire aviation department.*"

Jean DuBuque: "I agree with you, Bevo. The purchasing of aircraft parts should be through the distributors and, in most cases, the corporate owners are doing just that.

"I'd also like to mention the fact that the corporation aircraft fleet at the present time is approximately 10,000 strong, of which 1800 are multi-engine types. In addition, it has been estimated that there are about 15,000 corporations in the United States that could well adapt aircraft to their business activities. So the potential sales market for parts is terrific."

Paul A. Kennedy: "I'd like to say here that there's a lot of relief in store for the corporate owners. As we all know, most of the corporate aircraft today are either surplus types or new aircraft with surplus accessories. In the past year or so, most of these owners are becoming cognizant of the fact that the new type airline equipment, the equipment that is on the latest airplanes that are flying, will also work on these old airplanes. One of the big problems has been locating parts for old starters that were 10 or 15 years old when the corporate owners first bought their planes. There's a large program in effect now and we're personally working on it, whereby we hope to equip a majority of these corporate aircraft with this new equipment. We're already carrying stock for 14 airlines, and there'll be no parts problem when that new-equipment-in-corporate-planes day comes. It'll be a slow process... it may take years, but it's definitely in the mill."

A. M. Recker *(Mgr. Comm'l Sales, Goodyear):* "Just as you fellows are devoting your time to the development of a sound and profitable aviation industry, I, too, have elected to work toward the establishment of a perfect distribution program. To show what I believe to be a perfect distribution plan, I would like to compare the distribution of parts and supplies with the fuel system of an airplane. Let's consider the fuel tank as the manufacturer, the carburetor as the distributor or insurance stock, and the cylinders as the various segments of our Industry: airlines, corporate owners, modification centers, airport operators, etc. Under a program of the type mentioned, the airplane operator (cylinders) would draw from the distributor (carburetor) the proper amount of replacement parts (fuel) and consume it. The manufacturer, in the meantime, would be supplying the distributor with a continuing flow of replacement parts. I think that's the type of distribution program we are all shooting for; one that will guarantee an adequate stock of parts without undue duplication.

"During recent years, we have elected to take steps in the direction of supplying most segments of the Industry through distributors. We have done that partially through the establishment of consigned stocks with our distributors for delivery to the major airline companies. However, we have not permitted nor do we require our distributors to handle the sales work or the engineering work that is involved when selling our products to the airlines. The time will come when the distributor will be perfectly capable of handling all of these functions, too. Perhaps, as we realize more standardization in our parts, we can expand further in our effort to handle insured stocks in our distributors' places of business.

(*Continued on page 46*)

Facts and Figures!..

FIGURE:

The moral to this has something to do with "Winterization"—what pilots bring their planes to SAC to get, and what blonde Ann Allen hasn't got in her training as an SMU co-ed deep in the heart of sunny Texas. She can't skate, but her trim, 19-year-old, 5'6½", 118 lb. figure is mighty nice on ice.

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AVIATION CORPORATION

Division of Bendix Aviation Corporation

Baltimore 4, Maryland

Bendix Aviation Radio

Skyways Round Table

(*Continued from page 43*)

"I can understand the problems of many manufacturers who have a varied and diversified line of products. Perhaps some of those lines may be handled in great quantities with a very small dollar investment. It is quite feasible that a distributor could purchase those parts and place them on his shelves and deliver them as needed. I don't believe, however, that they can handle those products which require a considerable amount of engineering work. They don't have the engineering staffs to do it.

"To clarify my thinking with respect to our distributors becoming able to handle this engineering problem, I would like to mention one problem that arises in connection with some of our products. We sell wheels and brakes to the aircraft manufacturer. That wheel and brake is designed to do a specific job—a job controlled by the weight of the airplane, the landing speed, and other factors. When completed, the airplane is delivered to the customer and the customer, in turn, adds equipment which increases the gross weight of that airplane, thereby exerting a greater usage of our product than was designed into it. This condition, of course, is not true on every type of airplane delivered to the airlines, but when it does happen, it is necessary for Goodyear engineers and airline engineers to work out a satisfactory fix for the wheel and brake. I'd like to add that this statement is not made as a criticism of anyone, for changes made in the airplane usually add to its utility.

"I would like to hear any ideas that might be offered to improve our service or method of distribution. I also would be happy to talk to other manufacturers and tell them what we are doing."

Bevo Howard: *"Thanks very much, Gus, and I might add that I can speak very highly of the service you render."*

H. D. Wigley: "I'd like to add to that, too, Bevo. If other manufacturers handled their business the way Mr. Recker does, we'd all be satisfied."

Jean DuBuque: "I wonder if it would be possible to have a central source of information regarding the availability of DC-3 parts? Whether it would be through ADMA or some other organization, operators of DC-3's in the corporate fleet would find it extremely helpful to be able to go to this central source and find out what is available."

L. F. Zygmunt *(Pres., Gen'l Aircraft Supply Corp.):* "Without a doubt, the utilization of corporate aircraft has a profound influence on the economics of our general aviation structure.

"As distributors, we sometimes wonder how we can best serve the corporate market. Luckily, the answer is quite simple. Corporate aircraft operators' requirements are not much different than anyone else's.

"Number one, they're interested in the finest possible product. They're not interested in second-rate or third-rate items.

"Number two, when dealing with a distributor, they are keenly interested in quick, intelligent service. Unfortunately, prompt service is not always possible because it's difficult to anticipate all of their varied requirements. Some corporate operators must establish at least a bare minimum inventory of critical items to protect their uninterrupted flight schedules.

"Third, like the airlines, they want product information, and I think that's where the distributor does a pretty good job of it if he is aggressive and provides information for the corporate aircraft operators, his maintenance men and his pilots on the usage, overhaul, or best utilization of products.

"The fourth thing they're interested in is service after the part has been purchased and installed in the aircraft. The corporate operator is also interested in an adjustment

"SERVICE *to commercial customers is going to show improvement," promised Dan Tilden*

policy along with that service. They expect that a distributor can be relied upon to expedite factory re-work in the event of product deficiencies, especially during the warranty period.

"Lastly, the fleet corporate operators are recognizing the fact that they are becoming quantity buyers, and they're interested in a fair price. Luckily, very few are bargain hunters. They can't afford to be, dealing with the type of cargo and personnel they carry aboard their planes.

"Regarding standardization, it would be easier to service corporate aircraft accounts from a fixed-base operational standpoint when we have more uniformity of equipment. Right now some of the corporate operators have pretty much of a hodgepodge of accessory equipment in the nacelle of an airplane. That's not the way they've wanted it, but it's the way it grew.

"Procurement facilities for the fleet corporate operator have been considerably enlarged. In addition to the network of large distributing organizations, practically all of them ADMA members, a growing number of large fixed base operators who specialize in corporate fleet modification and maintenance are stocking replacement parts. These overhaul stations are filling a valuable link in the pipeline of aircraft supplies.

"When the corporate owner buys an accessory—a brake disc, spark plugs, a tire or battery—from a fixed base operator, he is providing a continuity of service for himself at various locations instead of at just a few large metropolitan areas. I think that's important and should be impressed upon the corporate owner. The corporate owner can be influential in expanding service facilities by doing business with aggressive and responsible service operators."

Bevo Howard: *"Hugh Copeland of Embry Riddle is here, and his observations should be of great interest. Embry Riddle is not only one of the finest aviation schools in the country it is also a fixed base operation."*

Hugh Copeland *(Vice Pres., Director of Training, Embry Riddle):* "I'd like to put my remarks in the form of a question addressed to Mr. DuBuque. The airlines have gone, in the case of the mechanic, to the use of specialists: carburetor specialists, ignition specialists, etc. Is there any demand from the corporate airplane owners for the old-type mechanic, the general mechanic? Are the operators having any difficulty in getting such type of mechanic? Can they afford to hire specialists in the various fields?

"I am also interested in knowing what chance the graduate of a commercial pilot course has of getting a job in the corporate aircraft field.

"I've heard the word, 'obsolescence' used here and I'm wondering if that isn't a word that should be applied to the curricula being used by the training schools."

Jean DuBuque: "There is a growing trend toward the employment of copilot-mechanics. Many of the corporations in their transcontinental operations have found it difficult to secure adequate maintenance of their aircraft. Consequently, in employing new personnel, some corporations insist that prospective pilots be mechanics as well, so that they may carry on minor maintenance as the aircraft moves around the country.

"There also is a growing need for a well-organized course in executive flying. At the present time, most of the corporate pilots have had considerable airline or military experience in the types of planes that they are flying for business purposes. It would appear to me that a specialized course directed toward corporation flying, where the student is taught basic administration and such problems of corporate flying as scheduling, dispatching, etc., would prove an invaluable contribution to aviation training.

"In my travels around the country, I've asked many corporation executives just what they thought was the type of employee needed in an aviation department. Invariably, the answer has been, 'We need men with good technical backgrounds as well as possessing high pilot qualifications; men who know the airplane inside and out and who can analyze some of the mechanical

difficulties that might arise during trips.'

"May I also point out that there is little demand for pilots who do not have instrument ratings. Practically all of the pilots being hired by corporations these days have ATR's or Commercial tickets with instrument ratings."

Bevo Howard: *"I'd like now to call on a gentleman who's been in the supply business for some time. Frank Ambrose, could you tell us what the outlook is as far as surplus parts are concerned?"*

Frank Ambrose *(Pres., Frank Ambrose Aviation Co.):* "Like Hugh Copeland, I've spent the last 35 years in all phases of this business. I think that the future of surplus is bad. It's drying up to the point where a lot of concerns are now disassembling engines for parts and disassembling accessories.

"One reason is that the manufacturers are so absorbed in the present and future development of aviation that they are neglecting other phases. If the manufacturers would set up a surplus division to manufacture parts to care for and maintain surplus airplanes, I think they'd be very smart. Unfortunately, however, that idea doesn't seem to be developing, and the result is that things are becoming more scarce and more scarce. The thermometer of that condition is in the prices. Two years ago we sold —92 crankshafts for $200; today we'd get $1,250 for them, but we don't have any. If that's what is happening now, you can imagine what it's going to be in 10 or 15 years."

Bevo Howard: *"How do you get by OPS on those prices?"*

Frank Ambrose: "That doesn't come under OPS at all because it's surplus."

Bevo Howard: *"Thanks very much, Frank. Now I'd like to ask Earle Scott if he has something he wants to say."*

Earle Scott: "Since the war, many airlines and most corporate aircraft have of necessity used surplus accessories of many kinds. And they were correct in doing so, for reasons of price, availability, etc. But today there are far more efficient and safer accessories available or becoming available for use in the corporate market."

Bevo Howard: *"Ray Gaillard, could you give us a general over-all picture of this situation from the standpoint of the government's attitude, and what the military's attitude and requirements are? If you could sum that up briefly, it would be a very fitting cap for the whole meeting."*

G. R. Gaillard: "It would be hard to properly sum up the government's attitude toward this interesting subject, and still be brief. However, I can point to one or two programs on which we are working with the military which will indicate the government's attitude and which will, no doubt, help the spare parts situation.

"First, the military use of commercial maintenance facilities. We have been trying to get a topside military directive authorizing local Commands to use existing commercial facilities for the maintenance of military aircraft when such facilities are available and adequate. Although there are general statements by the Department of Defense to the effect that all departments should use existing facilities rather than establish and man new ones, this does not seem to find its way down to the local Commander. There has been a tendency on the part of both the Air Force and the Army to develop their own maintenance facilities as their aircraft fleets expand. We feel that a good part of this maintenance, particularly in the small-plane field, could be done by commercial facilities as they exist today. Not only would the services get quicker and cheaper repairs but this added business would help maintain a strong, healthy fixed-base industry. This in turn would train mechanics and give us a greater mobilization potential in case of an all-out emergency. We have been encouraged by our recent talks with the Munitions Board on this subject and I feel that we may soon see more concrete evidence of progress.

"Another joint effort worthy of mention here is the military cooperation with our Air Coordinating Committee 'c' series aircraft production schedules. We have established 10 quarterly schedules covering a period of 30 months production of all types of civil aircraft. These schedules have military approval, and priorities for materials to manufacture the new aircraft as well as spare parts have been established.

"As the military program stabilizes and as the civil program begins to be recognized as essential, the aircraft and component manufacturers will know definitely the part they are to play in the military build-up and be able to make more realistic plans.

"From where I sit, the situation looks better and should continue to improve. The materials are becoming more plentiful, and as the military program stabilizes, I think we will all see a rationalization of orders which will help the manufacturers maintain a flow of spare parts to keep both the airlines and the corporate aircraft owners supplied with the spares they need."

Bevo Howard: *"Ray, I want to congratulate you on one statement you made: that the CAA has recommended that government agencies use contract methods to do work that can be done for those agencies. Certainly, it's a very encouraging trend in government that would supply the needs. So, congratulations again. And thanks, too, to all of you who took part in this Round Table. From a study of your comments may come solutions to the parts problem."*

H. D. Wigley: "I'd like to ask one question before the meeting is closed, Bevo. Is it possible that in time all of these Round Table discussions that SKYWAYS has held may be included in one book? I think it would be very helpful and very useful to everyone in the aviation industry."

Bevo Howard: *"As I understand it, a great deal of consideration is being given the idea of reprinting these Round Table discussions in one book and making it available to the Industry. When thoughts and plans are finalized, I'm sure SKYWAYS will advise us so that we may get copies."*

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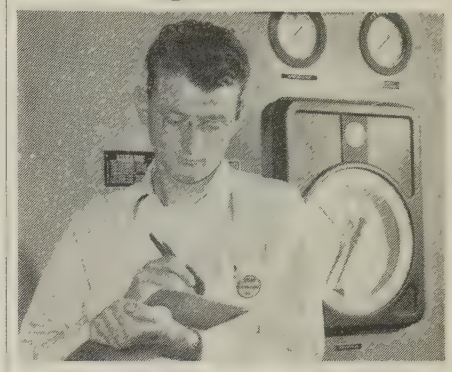

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Flight Clearances

(*Continued from page 17*)

are within 30 minutes of your destination. ATC can't clear the flight to an approach facility until the flight priority is figured. When the pilot receives a clearance to an airport, he can expect another clearance about 30 minutes before he arrives over his destination. This later clearance will clear him to an approach facility and also give him instructions for holding and an excepted approach time.

If the pilot's flight is under 30 minutes, he may receive a clearance to an approach facility, such as "*ATC clears Delta flight 372 to the Macon range station via Amber 6, climb to and maintain 4,000 feet. No delay expected.*" With this clearance the pilot can expect his next clearance about 10 minutes from his destination and it will probably be, "*Cleared for an approach to Macon airport.*" Or it may be, "*Cleared to the outer marker. Expect approach clearance at 09:58.*"

Off airways on IFR is still misunderstood by many experienced pilots. The regulations definitely state that all instrument flights will fly at the prescribed altitudes when off airways. These prescribed altitudes are listed in Fig. 1. Maintaining the proper altitude while off airways is the pilot's only protection from other off-airway traffic. Air Traffic Control has no control off airways. For the safety of all off-airways traffic, always fly the proper altitude for the direction of flight. If the pilot requests a clearance over a direct route off airways, the clearance will read something like this, "*ATC clears Delta flight 377 to the Macon airport via direct route. Maintain 4,000 feet while in control area.*" If the course to be flown is 295°, the pilot is expected to climb to 4,000 in the control area and then on up to 4500 feet while off airways. He will have to let down again to 4,000 feet when entering the control area at Macon unless he is cleared to enter at a lower altitude.

When IFR traffic is cleared for an approach to an uncontrolled airport, the instrument traffic must remember that local flying can operate with 700 feet and one mile visibility. If the weather is better than 700 feet and one mile, the instrument pilot will have to be on the look out for local traffic when he breaks out underneath. The control area only extends down to 700 feet. All traffic below this is uncontrolled except in a control zone.

No clearance is needed if the pilot takes off from an airport that is off airways, stays off airways and lands at an airport off airways. This pilot will need a clearance to cross airways and must fly at the prescribed off-airways altitudes.

If the pilot is flying VFR on airways and is over an overcast, he is perfectly legal as long as he maintains 500 feet vertical and 2,000 feet horizontal clearance from all clouds and has at least three miles visibility. If he finds that he can not maintain VFR and continue on course, he should hold a position VFR and get a clearance. If the weather closes in around the pilot and he doesn't have a clearance, he should get off airways as soon as possible.

If the pilot is on an IFR clearance and he has to reduce airspeed because of turbulence, he must notify ATC of the change in his TAS as soon as possible. This is important in order to maintain proper separation. There may be another flight at the same altitude just 10 minutes behind.

In marginal weather it is best to file a flight plan. Three miles visibility isn't much for two 300-mph airplanes on a collision course. There has been a lot of discussion about increasing the visibility requirements for faster airplanes flying VFR.

Many pilots like to file for 500 on top. This gives them the least effort in flying instrument weather. A clearance of 500 on top clears the pilot out of the control zone and to a position on top the overcast. It also gives him a priority for an approach at his destination. He must maintain VFR on top at all times between his clearance up through and down through. Even though he is maintaining VFR on top with a 500 on top clearance, he must report over the reporting points. Some Air Traffic Centers will not authorize a 500 on top clearance at night because of too much traffic.

Any time that the weather or mechanical failure makes it impossible to follow the flight plan, the pilot can ask for a new altitude. If you vacate an altitude without a clearance, you will have some explaining to do later. If an emergency does exist and the pilot has to climb or descend, he should advise ATC as soon as possible so they can clear the way for him. Be sure there is an emergency before vacating an altitude or not following a clearance, because there is a stiff fine if it was proved unnecessary.

If the pilot is on an IFR clearance and his two-way radio communication fails, making it impossible to receive any further clearance, the pilot has several alternatives. If he is VFR, he can proceed in accordance with VFR flight rules. If he is on instruments, he can proceed with his last clearance and make an approach as near to the estimated arrival time as possible. If he has received an expected approach time, he will be expected to make his approach at that time. The pilot's responsibility is to land as soon as possible and notify ATC so he won't be holding up other IFR traffic.

In the congested areas the pilot will quite often be cleared to the Air Traffic Control center before being turned over to approach control. The center will take over direct control of the flight and give holding instructions until such time as the flight can be turned over to approach control for final instructions. Once on the approach control frequency much can be learned from listening to the other traffic. For example, if a flight is cleared for an approach and misses, it can be assumed that the weather might not be as good as reported. This is often the case since the weather can change so fast the meteorologists have a hard time keeping up with it.

Upon reaching a holding point and being given an expected time, be sure to re-figure the gas supply. The holding times have been greatly reduced in the past few years, but there are still many times when it will be necessary to hold for 30 minutes or more. It is important to figure just how long the flight can hold and still have enough gas to get to the alternate, with reserve left.

If through unforeseen circumstances the pilot notes that he is running short on fuel, he can always declare an emergency and get a straight-in clearance. This is frowned upon and will require some explaining, so don't do it if it isn't absolutely necessary.

When the pilot's clearance reads, "*Maintain well to the right until past so and so.*" it is very important to maintain well to the right. In this case, Air Traffic Control is clearing another ship to let down or climb through this pilot's altitude. That lateral separation is the only separation at that time.

Instrument flight rules throughout the world are somewhat different so the pilot must be familiar with these rules before flying on instruments outside of the United States. When flying on long over-water flights, the altimeter is always set on 29.92. This allows 1,000-foot separation between flights even though they are not actually at the altitude read on the altimeter.

If a pilot is operating on an instrument flight plan, he must contact approach control at least 10 minutes before his ETA. If he has figured from his check points that his estimate was in error, he must give a new estimated time.

Upon arrival, be sure to cancel the flight plan. The tower will do it for the flight at a controlled airport. If the landing was made at an airport without a tower, it will have to be cancelled by telephone.

It is the ultimate goal of ATC to have IFR traffic flow with as little loss of time as VFR traffic does. They have made wonderful strides towards this in the last few years. With ILS, GCA, Omni, and longer runways, there is very little weather that can't be flown. The best way for instrument traffic to flow smoothly and safely is for every pilot on instruments to do his best to follow to the letter the clearance given.

Today's Lesson in Optics

I climbed aboard my Dizzy Six, and standing by the coffee fountain of youth was a new stewardess, new to me at least, and she was as small as your change from the meat market. I thought I should josh her a bit. This is a matter of protocol. So I took a look at the concentrated bit of femininity and I said, "When you get married, you'd better wear perfume so your husband can find you. You sure are . . . a . . . are boiled down, ain't you?"

"Big boy," she said, "there is more of me if you stand close."

Approach System

(*Continued from page 21*)

quency is required, just make a simple exterior adjustment which requires 15 or 20 minutes—and the job is done perfectly.

The Maryland Electronics Mfg. Corp., located in the outskirts of Washington, D. C., is perhaps as far along as anyone toward production of TVOR for sale. This company has been advertising their product and has received immediate and widespread response. Wilcox Electric Company, 14th and Chestnut Streets, Kansas City, Mo., also has a top-flight TVOR about ready to place on the market, and Collins Radio Corporation is interested as well.

In the meantime, the CAA has gone right ahead with a substantial TVOR program of its own. CAA versions of Terminal Omni have been given extensive low-weather evaluation tests at the CAA training field in Oklahoma City, at the CAA Development and Evaluation Center in Indianapolis, at Washington National Airport, and at Toledo, Ohio. By March or April of 1953, the CAA will have installed TVOR at Walla Walla, Washington; Glenn Falls, New York; Roanoke and Newport News, Virginia; Peoria, Illinois; Muskogee, Oklahoma; Stockton, California, and Dothan, Alabama. Seventy-five additional CAA installations are contemplated as funds become available and more complete evaluation is obtained.

The best way to illustrate how solidly the CAA is behind the TVOR concept is to quote a short excerpt from a speech by CAA Administrator Charles Horne before the National Association of State Aviation Officials late in November, 1952. Mr. Horne said: "Having produced TVOR and tested it for accuracy at each station where it is to be used—in this case only Toledo and Oklahoma City so far—Airways turns the problem over to Safety. Safety then produces criteria for use in the field by which the CAA Agents will establish operational procedures. These criteria refer to such items as the number and type of procedures to be allowed at a given airport; the obstruction clearances required; the deviation from criteria to be allowed; the initial approach procedures and altitudes; missed approach procedures; and a number of other safety requirements which may vary with the site being considered.

"When the criteria for TVOR use are ready for official publication, CAA Safety Agents in the field will then be ready to consider application from air carriers for its routine use. We will be ready, also, to start education of the non-air-carrier pilot who wants to use TVOR."

One thing must be pointed out to anyone who is thinking of installing TVOR on his field—be it a private corporation, municipality, airline, or state body.

See CAA first!

When an instrument let-down is necessary, according to the Civil Air Regulations, an approach prescribed by the Administrator must be used. In blunt language, this means that you can't use TVOR unless the CAA visits you, investigates your particular situation, and prescribes an official use procedure, runway by runway, for your airport. If you are interested in getting a complete understanding of what you are up against here, write to: Office of Aviation Information, Civil Aeronautics Administration, Washington 25, D. C., and ask for Civil Aeronautics Manual 60.46, Supplement 7. This sets forth in official detail, all the if's, and's, and but's of installing TVOR.

If you'd rather (Supplement 7 will be tough reading), you can call your nearest CAA District Office and ask to have the "Air Carrier Safety Agent" come to your field, talk things over, and give you an approximate idea of what weather minimums you may obtain through use of TVOR. If, for some reason, it appears that you will not be able to get advantageous minimums, you can forget about the whole thing right there.

Before getting deeply involved in the purchase of TVOR, you should further understand that "siting" is a ticklish and unpredictable business. Merely by opening the hangar doors at Washington National Airport, for example, they found they disturbed the TVOR readings. In some cases, the TVOR will have to be located completely away from the field due to local topography and electrical conditions. If this is done, the TVOR may still be used at a let-down aid, however. The plane would come on the actual station, then turn toward the runway in use as soon as it broke contact. In such an installation, however, the minimums would, of course, be higher than they would for a straight-in approach.

No buyer should think that locating his newly purchased TVOR is simply a matter of lugging it out and hooking it up in the middle of the airfield. The job must be done by experienced people.

After TVOR is installed, the CAA must flight-check it before they assign you your landing procedures and weather minimums, taking into account all of the various obstructions in the area, conflicts with airways, and with the traffic patterns of other nearby airports. This is a fairly exacting and expensive job—not something you can do in a Piper *Cub* late some Wednesday afternoon after the students have gone home. The CAA, so far, are the only people authorized to do it, and I'm told that as of this moment they aren't too well able to comply.

However, Administrator Horne, among other things, is charged with fostering aviation progress in this country. TVOR certainly comes under this heading, and Mr. Horne was not making empty statements when he offered TVOR to the State Officials as a coming thing. Something will certainly be done about getting TVOR properly flight checked, sited, and otherwise squared away. It may be that the CAA will delegate the authority to flight check an installation to the manufacturer of the TVOR. I'm told that "package deals" (you

(*Continued on page 50*)

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Approach System

(*Continued from page 49*)

get TVOR sited, installed, ready to use, for a price) are already being contemplated by Maryland Electronics, for one. Another quite feasible suggestion from a CAA official was to have the CAA appoint and train a responsible service organization in the techniques of siting, installing and checking the TVOR, and let this operation be chargeable to the owner.

The radio frequency band has been enlarged to take care of anticipated new TVOR stations. The 108 to 112 megacycle band has allotted all "even tenths" to TVOR. It is anticipated that TVOR stations will be separated by 125 miles on the same frequency, thus providing at least 25 miles of clear non-distorted signals usable for instrument let-downs at the terminal.

Some people have said that the streamlined TVOR—minus all the standby safety devices of CAA Omni—may be a serious hazard and should not be permitted. This argument does not seem too serious, however The CAA and the manufacturers have had a lot of experience with TVOR and have worked out most of the bugs. The TVOR *is* monitored. If it starts getting a screw-up, it simply goes off the air and does not go on transmitting dangerous false signals. When you consider that a TVOR would not be used except for a short time each day—to handle traffic—and that it would not be used at all on days when the weather was good, the chances for failure go down in proportion. Finally, when you consider that the worst that can happen—that the TVOR fails during an actual approach—will not hurt anybody, really. The pilot will simply overfly the field that trip. The argument against TVOR as a safety hazard simply evaporates.

There are, of course, many obvious advantages of TVOR. Because it can usually be installed somewhere on the airport, it eliminates the need for buying additional land, purchasing access rights-of-way and building roads over same, or relocating local objects which affect the radiation pattern. Being on the airport proper, the TVOR is perfect as a navigation aid. No matter how poor your aircraft receiver, the TVOR will lead you to the station.

The Air Transport Association points out another free ride which you get with TVOR—the VHF voice facility. To install a VHF transmitter alone will cost between $200 and $1500. But when you install TVOR, you get it in the package, and this means positive control by a local operator of the traffic, either in CAVU or IFR conditions. Planes vectoring in toward the field can make the transition with ease by leaving the standard VOR airway beam and locking onto the local TVOR beam.

There is, of course, an alternate method of getting instrument let-downs. You can install an H-facility near your field—at considerable expense—and home on it with your ADF equipment. Once over it, you can make a let-down based on compass heading and knowledge of the airfield. This method, however, is apt to get you into trouble in high winds when the plane is being drifted off its compass course during the let-down. If obstructions are close by and dangerous in nature, the use of an H-facility is apt to be risky. With TVOR, of course, the wind can't drift you away. You throw in the proper "crab" in the normal course of keeping the needle centered. It is significant with Mohawk Airlines, who already have an H-marker at Ithaca, are installing the Terminal Omni anyway. They aren't in business for fun and games. They must feel TVOR has the goods or they'd sit back and relax with their H-facility.

Still another type of instrument let-down—through use of the brand new Distance Measuring Equipment soon to be added to all CAA omni stations from coast to coast—has been tested and found practical. At present, however, the cost of airborne DME is fairly high, and the bugs are not quite out of it. TVOR and DME will doubtless join hands in the very near future, however, and provide an even better low-cost ILS.

It is estimated that there are some 200 airline stops in the nation which are now being served by feeder lines without any type of let-down aid whatsoever.

Let's take an example.

A DC-6 is scheduled to depart from Washington, D. C. for Miami, Florida, at 6 o'clock in the evening. Over in West Virginia is a family which wants to get aboard that plane. They go to their local airport—one without any let-down aid—and buy a ticket on the local feeder airline, which the agent assures them will make the connection in Washington.

Then the weather closes in. The restless family can hear the feeder plane droning around up in the soup, unable to land because of the low ceiling. Finally, the plane gives up, flies onward, leaving the unhappy little group to their own devices. "I've had my lesson," the disgruntled father says. "We'll take the train. You can't depend on these airlines!"

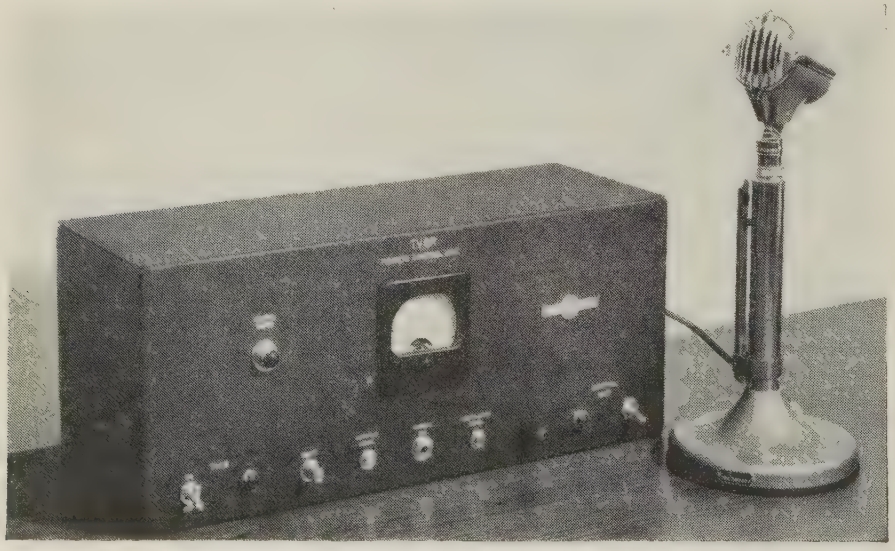
There is, of course, one bottle neck in this situation. It is the fact that the small municipal field in West Virginia did not have a low-weather approach aid. TVOR would have prevented the whole bothersome dilemma. The feeder plane could have made a normal let-down, boarded the Florida-bound family, and carried them over to Washington right on schedule. Multiply this situation by hundreds of similar situations around the country, occuring from time to time, and it adds up to a critical problem which can only be solved by wide-spread action on the part of all parties concerned.

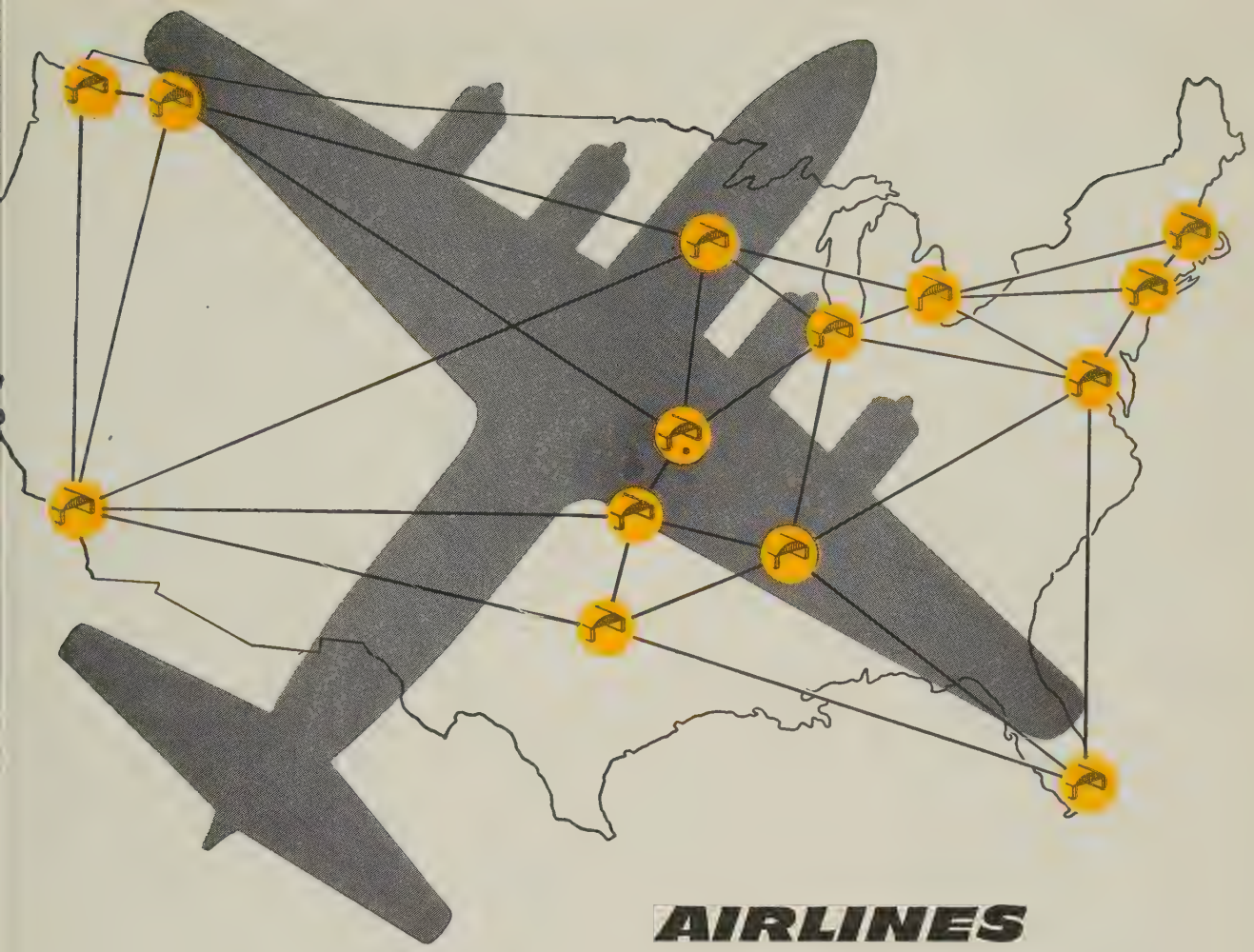
A number of municipalities, notably in Maryland, have already contacted the manufacturers of TVOR for facts and costs. I saw a letter from the air transport department of Gulf Oil, requesting similar information. Other straws in the wind indicate interest from state authorities, airlines, and even private individuals. These 200 airports at which airline stops are now being made with no let-down aid at all should certainly be a fertile field for sale of TVOR. In addition, some 200 or 300 *more* airline stops are slated for service in the near future, and these should make the TVOR demand really skyrocket.

The corporation air-transport operation, which has been growing sensationally and is still on the move, can be expected to adopt TVOR to make airfields useful in low weather. As TVOR goes into wide-spread use, pilots and operators are bound to uncover advantages that are currently unknown. Frank White, who did most of the work in putting together the original ATA terminal omnirange installation, puts it this way: "If we don't see at least 200 TVOR installations in the next three years," says Frank, "I'll eat my shirt, buttons and all."

We're certain he won't have to.

COLLINS TVOR—*The Terminal Very-High Frequency Omni-Range developed by Collins employs a Remote Control Unit (below) which can be used as desk-top unit or rack mounted*





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Let-Down

(*Continued from page 19*)

the can to the left and the needle flopped to the right. I was making an "S" out of myself. "Look at them needles," I cried out to my cowering copilot. "They're waving goodby to me!"

Essing, unfortunately, is built into the ILS, and the purpose of this story is to show you how you, too, can keep from making an "S" out of yourself while using the Localizer.

The deceit of the ILS

There are mechanical and there are psychological reasons why the ILS naturally causes essing.

The Localizer does not tell you how far, how much distance, you are off the track. (In this story, we shall concentrate on the track beam, for the glide path beam is just the same but not so skittish.) It does not tell you that you are off to the left, say, 10 feet or 100 feet or 1,000 feet. It tells you simply that you are off, and roughly your *angle* of displacement.

The angle of displacement may mean a 1,000 feet if you are well back, a 100 feet if you are close, fairly close, or 10 feet if you are quite near. What the Localizer doesn't tell you is how far you have to go to the side to get back on the track.

Suppose you think that you are close in and you go to the side just a little, but actually you are farther back than you thought; in this case you do not get back on the track until you have passed the end of the runway, or until you pick it up by eye and get over by the use of that magnificent electro-magnetic wave receiver.

On the other hand, if you are close in and you think that you are farther back, you take action accordingly. If you are a good piece back, a two-dot deflection of the needle, for example, will mean that you are quite a ways off the track and so you take a good cut to get back on. But in reality you are close in, so wha' hoppens—you simply gallop right across the track just as I did.

Figure I shows what happens if you think that you are close in, but actually you are farther back. Figure II shows what happens if you think that you are back a good ways, but actually are close in.

Figure III shows that the Localizer does not tell you at all how far off the track you are, and so it does not tell you how far you have to go to get back on the track; and it does not tell you whether you will be able to make a gentle bank and get on the track or whether you will have to make a hurried and abrupt turn. What the ILS needle tells you is that you are on such-and-such a (censored) radial from the beam hut. You can see at once that if you are close in, a full deflection of the needle may mean that you are only a little way from the track. In fact, you may be lined up almost exactly for a good landing.

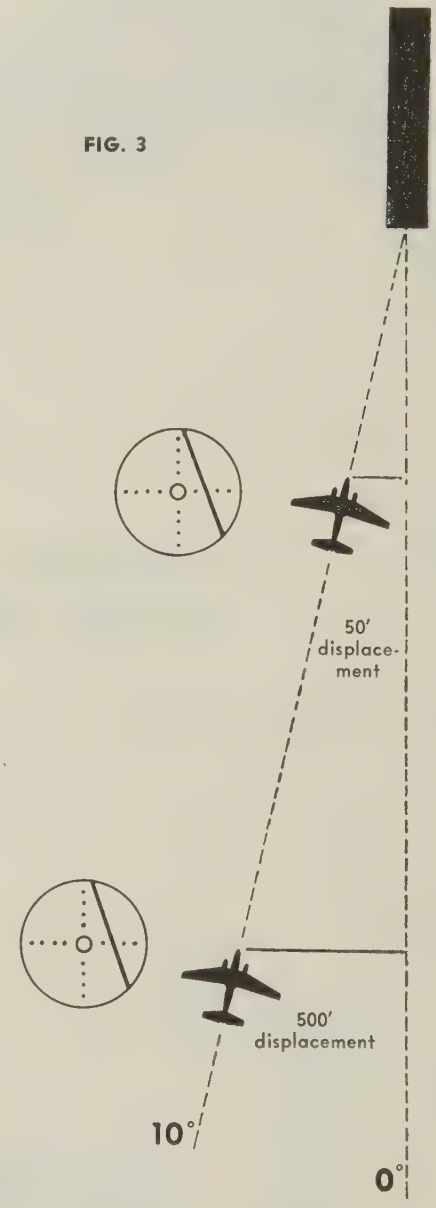
On the other hand—or on the other needle—if you are far out, a full deflection of the thing may mean that you have to go a long way to get back on the path. There, as Willy Shakespeare put it, is the rub, the hitch in your pitch.

Thus it is that it is almost impossible to make a safe approach unless you have had a lot of experience, or have read and understood this story.

You can be your own Zero Reader

No doubt many of you have read about the Zero Reader. It is a marvelous instrument and as easy to use as a mustache cup.

FIG. 3



As a matter of fact, I'm so much in favor of the Sperry Zero Reader that I've given the handy little gadget to have in a cockpit as much publicity as I can get away with, without appearing to have a financial interest in the company that makes it. Be that as it may, not every airplane includes the Zero Reader in its equipment, and perhaps for the pilots of those aircraft, this discourse might help.

The Zero Reader can use any kind of radio wave emanator, and it can use the waves of the ILS beams, although the Zero Reader needs no beams. The Zero Reader senses (by a kind of cybernetics) how far off the track you are, and it curves you into the runway just as you would do it yourself by use of your eyes—and it does it with ease, comfort, and precision.

So, one day in the cockpit chawing along toward Mexico City, I was relaxed and not able to protect myself when I was overtaken by an idea. Could we in our human "brains" do the thing that the Zero Reader was doing? An analysis showed that we could, in a rough but surprisingly effective way. Instruments like the Zero Reader and others of the kind are much the best, but ILS is going to be around for a long time, so that is why I am writing this story.

The way the Zero Reader works is most simple and, like all simple things, astonishing. The Zero Reader measures your angle of displacement from the track. Your ILS instrument does this too. This is quite the same as identifying the radial that you are on. We can call this the angular displacement. Then the Zero Reader, and this is the magic part of the whole deal, takes off the angle of displacement at a rate proportional to the amount of displacement that there is left. This is a smoothing-out curve. For you mathematics sharks, it is an exponential.

Can we do this job in our minds? Yes, we can, to a large extent. Not with the ease of a doggone box that can't worry, but with pretty good results.

What the needle means

The needle merely identifies the radial that we happen to be on. Say that the needle is displaced two dots. If you are far back, it means that you are a long piece from the glide path. But if you are close in, it means that you are near the glide path. Obviously, we somewhat sapiens have to learn a way to do a proportional job somewhat as the Zero Reader does it, although perhaps with not the same aplomb. Here is how.

If the needle is moving rapidly to the side of the dial, it means that you are quickly increasing your angle of displacement. If the needle is going for the side at a decreasing rate of speed, it means that you are increasing your angular displacement at a decreasing rate.

When the needle stops moving to the side and holds its position, say three dots over, it means that you are flying down the radial and that you are closing-in on the track to the runway at nearly the rate that you wish. If you hold the needle steady in its three-dot-over position, you will come to the end of the runway quite nicely, although you will be not quite lined up. Read that sentence again. It is the *tete* of the whole thing.

No matter how far over to the side the needle is (but not against the peg where it cannot move), if it is steady it means that you are flying exactly down a radial to the ILS hut and thus you are coming into the track only a trifle less rapidly than you wish, so nearly to the proper convergence that your

modest reporter in practice usually considers a steady needle quite all right. Shucks, if you pick up the landing end of the runway and you have to make a 3° turn or even a 6° turn to line up, it is no matter. A man who can't nose a ship over 6°, doesn't have his heart in it.

But this is what deflowers most of the pilots who are new to the vulgarities of the ILS. They see the needle over to the side. They steer toward it. Since the needle gets more and more sensitive as one gets closer in, the hapless birdman finds himself swinging the nose more and more abruptly to the right and then to the left and then to the right. The aerial hula hula.

How to steer by the needles

The needles can be outguessed, but it helps a lot to have a good steady indication of your heading. The gyro compass is ideal. Lacking that, a gyro direction device—the kind you set by hand to the magnetic compass—is next best. Next best, and quite adequate with a bit of familiarity, is the magnetic compass in connection with a gyro turn indicator.

We are now about to make a blind approach. Say that the ILS track is 132° coming in for a landing. We fly well back away from the airport so that we will have time to get us and the needles settled down. Perhaps we use the outer marker to get us lined up if we have an ADF. No matter, though. We go out to the northwest so that we can turn back and be roughly 312° from the airport. We do this and we note the track needle. It now moves quite slowly since we are so far out and we have no trouble getting it to the center of the dial and holding it there.

It is when we are closer in that things begin to happen. The needle, fairly gradually but persistently, swings, say, to the left. This may be caused by a change in the drift angle as we descend, or it may be caused by us —we don't know. We turn toward the needle and we keep on nosing over until the rate at which the needle is going to the side slows down. Just as soon as it slows down, it means that we are overtaking a radial to the runway. We do not wish to overrun this radial. We then take off any turn we may have. We are now nosing into the radial at a steady rate, or we shall in a moment.

This is hard to say in English and make it vivid. Note the diagram. When the needle is going toward the side, it means that we are continuing to go to a radial that is further out, from the 2° radial, to the 3°, to the 4°. Now, when the needle is still going to the side but is slowing down its rate of doing so, it means that we are going to the side ourselves at a less and less rate. The decrease in rate means that sooner or later we will be in such a position that the needle will not be going to the side anymore and we will be lined up on and flying down a radial to the runway. This is awkward to say in words, but the situation is simple enough. When you are nosing to the left, say, and the needle starts slowing down, be ready to nose a trifle to the right, that is, to stop nosing to the left any more and be ready to nose a trifle to the right so as not to overrun the needle.

That is your first signal; the slowing down of the needle that has been moving to the side. You know about the compass direction of your radial; runway at 132° and a radial 3° to the left would mean a radial of 135°. You don't have to calculate that; this is just an explanation.

Now, you nose a bit to the right. The needle stops in place. It is over to the side, but it is steady. That means that you are just about where you want to be. You are, in an angular sense, very close to the track path and also you are headed nicely for the end of the runway.

Right here is where I always made my bad mistake, and I still have an awful urge to make it again, to quote my old friend Errol Flynn. I am a neat fellow and I always have my spittoons arranged symmetrically around the rooms at home, and so I yearn to see that doggone needle down the middle—not over here, not over there, but right down the middle. If you are a purist, too, just remember that when the needle stops going over to the side, you are very nearly where you want to be. The only thing that you can do in the occasion we are taking as an example, is to nose a trifle to the right and then a trifle to the left. That is, if you wish to trifle with the ILS.

Summing up

If I sum this up right, maybe St. Peter won't do the same for you, for a time yet, anyway. At any rate, a little practice in the right places should help.

Go well back to pick up your ILS paths—the hell with the buzzard in the tower! Pick up your paths, bracket, and start in. When the track needle starts going off, don't get panicky. Go after it until it slows down, ease up until it stops, hold it. You are all right, brother. Let it not worry you that the needle is way off to the side, (but not against the peg, of course) for when you have the needle stopped you are doing swell.

When the needle—and this is a repetition of the above—after being stopped starts going to the side again, either side, chase it until it slows up. When it slows up, you slow up your chasing. When the needle stops, note your heading.

If you wish the needle in the center of the face of the instrument, this is what you do. When the needle is stopped, note how far it is displaced, and this will give you your heading to the runway for your gyro. The center track is not far away. Nose toward it slightly; if your radial is 3° off, don't nose over twice that. Be ready to nose to the bearing of the track.

When the needle gets skittish, it means that you are close-in to the end of the runway. Just fly your heading. Ignore the needle, even if you think it ought to know what it is doing. The needle, as Godfrey said, is like a woman, when you get close it begins to waver. Now, read this story again. Above all, don't make an S of yourself.

Confessions Aloft

The various airlines, including what Sadie calls 'the benutted American Airlines', from time to time have a canvass to see what classes of passengers they are getting and also what the vic . . . customers think about the service, if any. They pass out questionnaire folders which the passengers are supposed to fill in but not sign their names to because the airline managers have a rather naive idea that a person is more likely to adhere to rectitude if he is not to be found out, although this concept is hardly supported by the recent history of the cocktail station known as Washington.

Your modest reporter has always had the sneaking suspicion that stewardesses took up the strange profession of pitching dinners and curves aloft for the practical reason that they would meet a lot of men who at least could afford to buy an airline ticket and who had just a bit of recklessness in them as shown by their decision to challenge gravity in the wild blue yonder, and who would be subjected to the charms of the lovelies for an effective period of time.

Any ulterior motives of this kind the gals have stoutly denied to me, naturally arousing my suspicions still further. "Why," Sadie explained to me, "I know that I spend a lot of time talking to the men passengers, but I'm just wiling away the time."

I got 'em dead to rights on my last flight, though. The engines were snoring along through the Texas sky and I went back to the galley to pinch a cup of coffee and whatever else was handy, and I found the gals passing out the questionnaires and they had a system for it. Perhaps none of the girls had ever dealt poker in a gambling joint, or even faro, yet when they picked up the questionnaire after they had been filled out by the vic . . . passengers, the girls would mark them by use of the thumb nail so that they could be identified with the person who filled them out.

Why did they do this? Girls are practical, chum, no matter how improbable and inexpedient they appear to be. You see, the airlines wished to know if they were getting just the upper crust of business society as we used to or are we getting a good cut of the ordinary people who pay their taxes. So, the questionnaire had a table of incomes and the customer was supposed to check what his income was.

Well, the stewardess would pick up a few of the folders, and thumbmark the one that was handed over by a man who did not have that philosophical look in his eyes that brands him as already having a wife. Then the stewardess would high-tail it back to the galley, pull the curtain closed and look up the income.

"Ohhhhhhh!" one of the girls gasped, as she spoke to the other stewardess. "You see that handsome man up there in Seat 4A? He has such a cute figure . . . Fifty Thousand."

I swear on my corkscrew that I did not make that up. —Hy Sheridan

Convair 340

(*Continued from page 12*)

driving Hamilton Standard full-feathering and reversing solid dural propellers. A water injection (water/alcohol mixture) system increases the take-off horsepower rating of each engine to 2400 BHP. This engine features a two-speed blower, low-tension ignition and power-indicating torque meters. A part of the same torque indicating system is utilized for the auto-feathering system.

The airplane is also designed and stressed to accommodate turboprop engines. The Allison Division of General Motors Corporation has flight-tested a 240-type Convair with 3,000-hp Allison turboprop engines. The Air Force has ordered the 340-type aircraft equipped with Allison T-38 turboprop engines. The service testing of these by the Air Force will be watched with interest by all airlines flying the 340 in the event that future developments and competition encourage the utilization of turboprop transports within the next few years.

One of the features of the 340 powerplant installation is the use of engine exhaust augmenters as a means of supplying the engine with cooling air, and for furnishing the heat source for wing, empennage and cabin heat. Two augmenters (long tubes encased by cylindrical muffs) lie along the top of each nacelle, extending from the engine to the trailing edge of the wing. The exhaust from two cylinders is combined into a common exhaust stack opening into the forward throat of the augmenter. These clusters of stacks deliver the engine exhaust gases into the forward opening of the tubes at a high velocity. This creates an area of low pressure at this point, thus causing an air flow across the cylinders through the cowl opening around the propeller thrust bearing. This combination of a tightly cowled engine with the augmenter exhaust principle results in adequate cooling for ground operations and minimizes in-flight drag by the elimination of cowl flaps, carburetor air scoops, etc.

The carburetor air scoop is located in the top portion of the cowling, and sufficiently above the leading edge of the cowling lip to prevent ice accumulation on the carburetor intake. The cowling is equipped with two upper and two smaller, lower residual heat doors, which permit rapid dissipation of engine and accessory-section heat on the ground.

The cowling is of an "orange-peel" type of construction, hinged at the trailing edge to permit the four segments to be opened outward from the front. This allows quick and convenient access to the engine. This feature has been very useful on the predecessor 240, and is a considerable factor in shortening mechanics' working time in effecting minor repairs at intermediate stops. Any one of the four sections can be opened independently of the others, to permit access to that portion of the engine assembly.

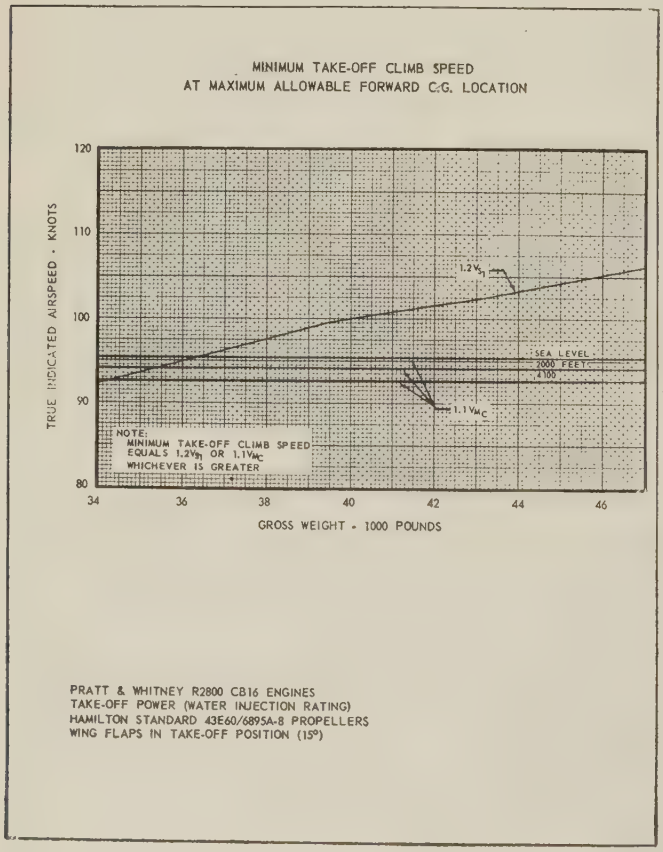
A muff-type heat exchanger on the Convair 340's engine surrounds each augmenter tube. A portion of the engine cooling air enters the muff and is heated by the hot exhaust gases passing through the tube.

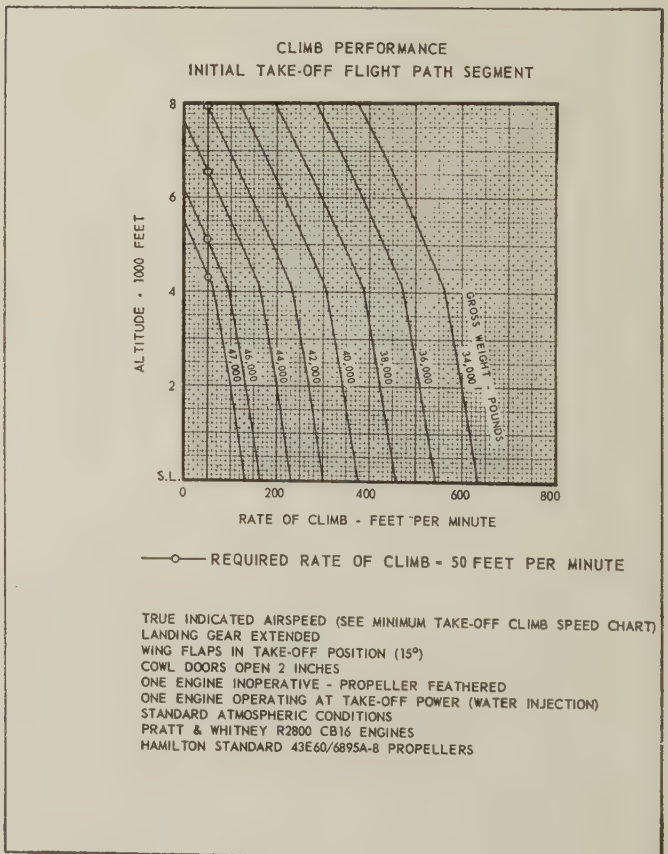
For wing and tail assembly anti-icing, this heated air is ducted to the leading edges of the wings and empennage where, after circulating throughout the leading edge structure, it is spilled overboard through louvres in the wing tips, fin tip, and on the underside of the tail cone at the inboard ends of the elevators.

Cabin and cockpit heating is accomplished by means of this same source of heated air. This is ducted through a radiator-type heat exchanger, where the cabin pressurization and ventilating air is heated before being delivered to the cabin duct system. This cabin heating is automatically controlled, but it is equipped with a manual control in case more heat is needed for anti-icing purposes.

The cabin, cockpit, and cargo compartments are pressurized. The 340 is designed for an ultimate pressure differential of 8.72 psi. This permits the cabin to be maintained at equivalent sea-level at an airplane altitude of approximately 9,000 ft., or an equivalent cabin altitude of 8,000 ft. at an airplane altitude of approximately 20,000 ft. This much pressure differential is a very desirable feature. A high-speed airplane is badly penalized on short flights (200 miles or less) if the pilot cannot maintain a higher airplane altitude for the maximum length of time and then make a faster descent upon arrival at his destination, without subjecting the passengers to the discomforts of a fast cabin descent.

The pressurization compressor is installed on the accessory section of the right engine. A very commendable feature of this installation is that, during the take-off, with the





auto-feathering system armed, the compressor is automatically disconnected upon an indicated loss of power of the left engine sufficient to trigger off the auto-feathering system. For cruise this feature is connected into the manual (normal) feathering system. This permits a quick recovery of the 75 horsepower required to drive the compressor for use during single-engine operation.

The interior of the airplane is conventional, except that the integral loading steps are located on the left side of the fuselage, immediately aft of the pilot's compartment. This makes it necessary for passengers to board and deplane in front of the engine and propeller. This is also the case on some models of the predecessor 240, and has not created any particular problems. It does get the passengers away from all service doors quickly, and permits maximum service time to be utilized by ground personnel. The passengers enter the cabin via the folding stairway and through a forward companionway. Along the near side of this companionway are located baggage racks which permit the passenger, if he so desires, to store his luggage upon entering, and to reclaim it upon deplaning. This feature will contribute greatly to the elimination of the common complaint of the busy traveler that too much time is wasted between deplaning and departure from the terminal by ground transportation.

The cabin seats 44 passengers in 11 rows, with two forward-facing seats on either side of the center aisle in each row. The lavatory and the service galley are located aft of the passenger compartment. The seats, reading lights, air vents, etc., are conventional and were found to be quite convenient and comfortable. One noticeable objection to riding in the aft part of the cabin was the noise apparently caused by the augmenter tube exhaust arrangement. The noise level sounds high, but closer analysis of it seems to indicate that the distress experienced from the noise is not due to its intensity, but rather to the type of noise created by the high-pressure exhaust stacks through the long augmenter tubes. The passengers may find that this contributes to a sense of fatigue on flights of any considerable duration. Anything that could be done to reduce this noise level would increase passenger comfort by that same amount.

The noise level within the cockpit was satisfactory. The cockpit speakers installed in the UAL model being flown were very readable during flight, and conversation between pilots was conducted without use of interphone and at near normal voice levels. This in itself is an important contribution toward reducing pilot fatigue, and Convair is to be commended for it.

It would seem that the days of apparently adding the cockpit as an afterthought are over. Certainly, pilots have been justified in their thinking that such must have been the case with some airplanes of the past. Convair is to be congratulated on their basic cockpit layout. Their engineers collaborated on its design with airline pilots, and as a result the requirements of safety, convenience and comfort have been incorporated very successfully in the 340. The cockpit is roomy, and the over-all visibility is good.

The windshield panels are large and free from view-obstructing braces. The main panels in the pilot's direct vision windows are made of laminated Nesa glass. These can be electrically heated to keep them free from ice, frost, or fog. After years of operating with reduced visibility from partially coated windshields, one appreciates the added safety feature of having unrestricted windshield visibility while making an approach out of icing conditions. The side windows are large and deep, permitting unrestricted view. These side windows roll back far enough that the openings are easily usable as an escape hatch.

The cockpit seats are comfortable and easily adjusted. The rudder pedals adjust quickly by means of a small crank just above the pedals. More forward adjustment of the seats would be desirable to bring the smaller man into the most comfortable position in relation to the wheel. Also, an additional adjustment feature on the arm rests would contribute to the maximum of comfort during long periods at the controls.

While it may seem that too much emphasis is being placed on pilot comfort, I am firmly convinced that everything that can be done to reduce pilot fatigue is a definite contribution to safety.

In addition to the usual engine, propeller, landing gear and wing-flap controls, the auto-pilot control, radio frequency selector and audio selector are located on the pilots' control pedestal. A gust-lock control lever locks the ailerons, elevator, and rudder to prevent buffeting by wind on the ground. A built-in safety device prevents advancement of the throttles to take-off power unless the flight-control surfaces are unlocked.

The controls on the throttle pedestal are convenient and easily accessible. It would have been an improvement, however, if the controls on the throttle pedestal had been re-arranged so that the mixture controls were separated from the carburetor heat controls to prevent accidental pulling of the mixture when reaching for the carburetor heat. This could have been accomplished by installing the mixture controls on the left side of the pedestal inboard of the pilot's throttles, where there is now a vacant space not utilized by the new auto-pilot control. UAL has improved on the original pedestal by

(Continued on page 56)

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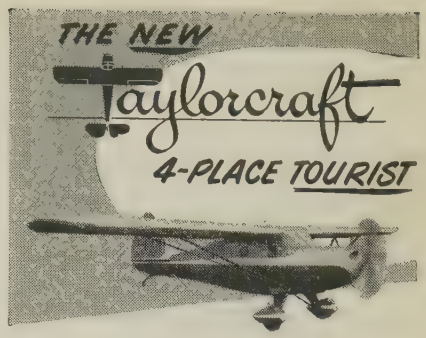

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Convair 340

(*Continued from page 55*)

installing a mixture control lock which must be lifted before the mixture controls can be pulled back to "idle-Cutoff." This is a commendable feature, and should be made a standard installation.

All instrument indicators on the panels, including the gyro instruments, are electrically powered. The instrumentation, as observed on the UAL model, seemed convenient and satisfactory, with the exception of the flap indicator. I am of the opinion that flap management is too important a feature in the proper handling of the 340, or any other modern airplane, to have the flap position indicated by so small an instrument located in the lower center instrument panel, where it cannot be quickly and easily read by the pilots. I believe that a flap indicator of standard instrument size of 3¼ ins. diameter with 1° flap markings should be made a standard installation. The flap indicator should be located in a position as near as possible to the upper right-hand corner of the center instrument panel, so that it can be easily and accurately read by the copilot, and is also readily seen by the pilot.

The cockpit and instrument lighting comprises a dual system of red and white lights. The general cockpit illumination is from a light located in an overhead panel. This furnishes rheostat-controlled white or red light, as desired. The overhead white light is also controlled from a pushbutton on either of the aileron control wheels.

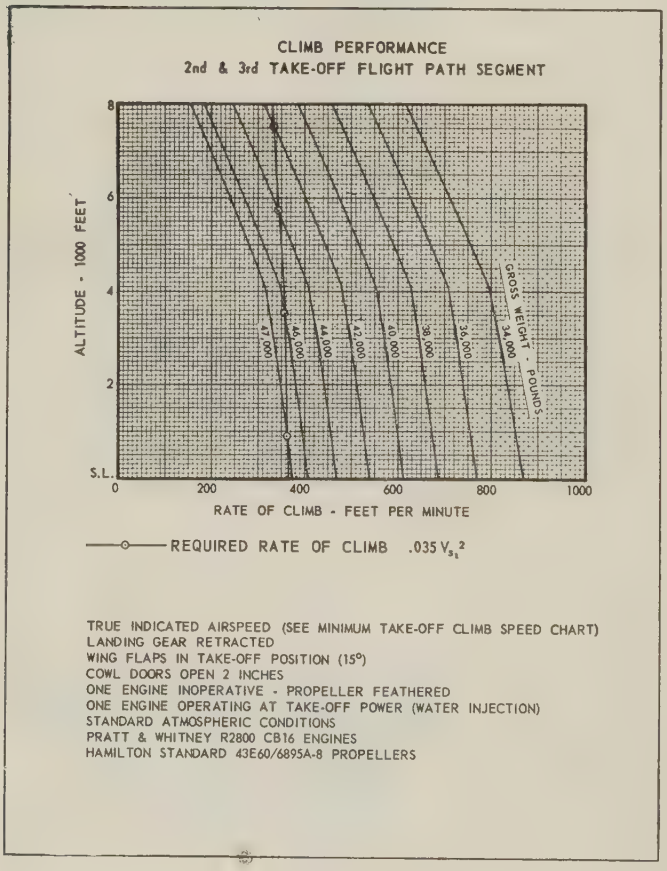
The side consoles are illuminated by red lights. The instrument panel is front lighted from a row of lights located under the aft edge of the glare shield. These lights, alternately red and white, are controlled by rheostats so that any degree of red and/or white light can be obtained to give the pilots the maximum comfort and visibility. The general illumination appeared to be satisfactory and the ability to flood the instrument panel with plenty of white light is a particularly desirable feature when a pilot finds himself facing heavy lightning during night thunderstorms. However, it was noticed that some instruments would need adjusting, or possibly rearranging, to get more satisfactorily uniform illumination on the face of the dial.

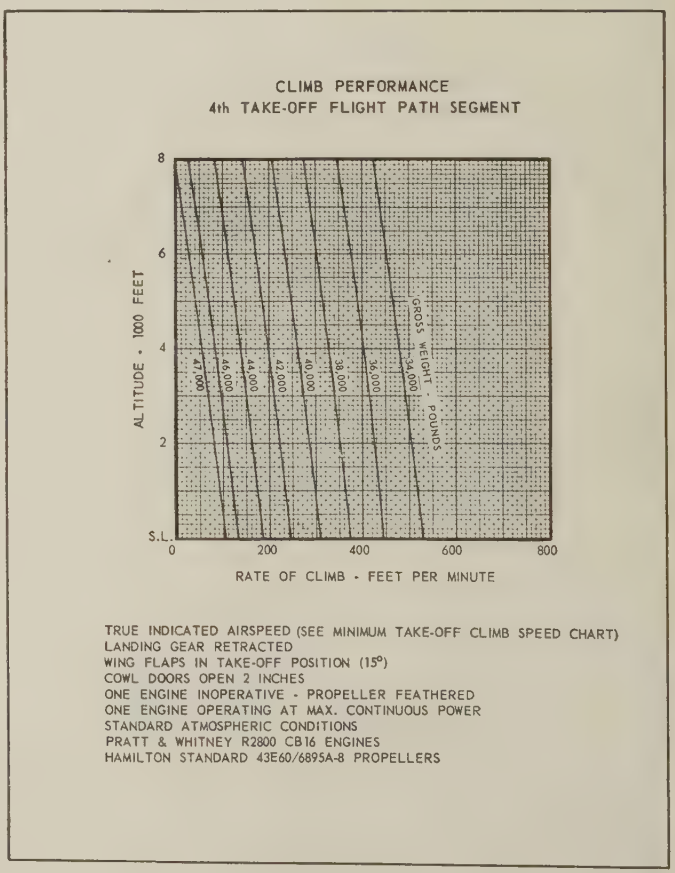
The one phase of airplane evaluation that is of paramount interest to pilots involves the actual flight performance. The two days of flight evaluation and demonstration were very productive. For the demonstrations and the flight-evaluation tests, the airplane was loaded to the maximum gross weight of 47,000 lbs. and with the CG loading at the maximum allowable forward limits. This produced the least favorable operating conditions for which the airplane is certificated. The critical engine failure tests were made on the left engine. Everything was done to make the tests the most unfavorable to the airplane's performance, as that is the condition that concerns pilots in actual operation.

During taxiing, the nose-wheel steered a little hard, but part of this was attributable to the extreme and unusual forward CG-loading being used for the tests and to the maximum gross weight under which the airplane was tested, rather than to any difficulty in the basic steering mechanism. The nose-wheels are locked to a common, rotating axle. Since the two interlocked wheels have different turning radii, one must slip during the turn. This has proven to be a simple yet effective method of eliminating shimmy. The airplane steered harder than one with a single nose-wheel. However, it was not objectionable, and the increased safety factor of the dual wheels and the anti-shimmy dampening is desirable. On the take-off rolls, the airplane was very stable and held straight down the runway without a tendency to yaw due to engine torque.

Within the limited amount of flying that was done at San Diego, I was satisfied with the flight characteristics of the 340. The 6° 30′ dihedral in the wing improved the in-flight stability of the airplane over that of the 240. The increased dihedral did not seem to have affected the single-engine performance of the airplane. The controls were easily coordinated and their response was positive and firm. The 340 would fly "hands off" when properly trimmed and was quite stable directionally. During a two-engine V_2 speed climb-out, the airplane responded readily without any tendency to over-control and, in spite of its tremendous acceleration, was easy to stabilize at the desired V_2 speed. At all times the V_2 speeds and flap settings should be closely correlated for maximum single-engine performance.

During the stall tests that were made while at the factory, there were no undesirable characteristics noticed, and in approaching





to a stall the airplane gave ample warning through pronounced buffeting. The pilot had aileron control during a stall, and it was possible to make right and left turns during the stalled condition while the airplane continued to settle. In the "power on" stalls, there was no tendency to whip. The yoke travel was restricted somewhat when the pilot's seat was full forward, and prevented full-up travel of the elevators. I have since been informed that this has been corrected.

During approaches and landings the airplane handled well and responded nicely to power settings and flap management. Prop reversal after landing was easy and normal. A single-engine full-throttle reverse, as tried on two different occasions, caused no undue yawing and was readily held by means of nose-wheel steering.

A feathered-propeller single-engine take-off was accomplished with a gross weight of 47,000 lbs. The take-off was made under normal conditions, and no attempt was made to anticipate "engine failure." Since V_1 exceeded V_2 for the runway in use, the left engine was cut at the take-off V_2 speed and the propeller automatically feathered. The automatic disconnection of the pressurization compressor on the right engine was readily appreciated when seen in operation.

The airplane climbed out readily on one engine at the maximum take-off horsepower with 59½ ins. manifold pressure and 2800 rpm and with water injection. It cleared the theoretical 50-foot obstacle at an estimated 4800-foot point on the runway and at the end of the first minute's climb was 440 ft. above the runway. At the end of two and a half minutes of climb with take-off power, the head temperature reached the maximum allowable 263° C. and power was reduced to METO power. At this time the climb was temporarily discontinued for a few seconds to permit cleaning up the airplane by retracting the flaps and to increase the airspeed to zero-flap V_2 speed. While this configuration in fourth segment climb was not a normal single-engine climb-out technique, it was done to determine the cooling ability of the engine at the 15° flap, V_2 airspeed. It indicated that the use of normal technique in getting the airplane cleaned up and to zero-flap V_2 speed would give the pilot a reasonable margin of single-engine operation without excessive heating, and that in an emergency it would be possible to use take-off power as needed. At the end of four minutes of single-engine climb, the airplane had reached an altitude of 1,000 ft. above the runway at a gross weight near 47,000 lbs.

The single-engine take-off and climb performance exceeded the minimum CAA requirements for certification. This take-off and climb data was obtained under relatively favorable flight conditions and should not be construed as performance available during all weather conditions. The current Civil Air Regulations do not provide for the most adverse climb conditions in all Air Carrier Operations. The Convair 340—along with all untested types of multi-engine airplanes in commercial passenger service—should be given complete evaluation tests under actual hot, humid weather conditions.

Previous zero-thrust windmilling props take-offs clearly showed that a windmilling propeller had an adverse effect on the airflow over that wing and definitely affected single-engine performance. Even though the rpm was set for the calculated zero thrust at varying airspeeds, it was observed that the interruption of the airflow over the air foil had a decidedly detrimental effect on the flight characteristics under those conditions. If the propeller feathers properly on the engine failure, the airplane should perform satisfactorily under normal conditions.

However, it is this pilot's considered opinion that the regulations under which "T" category airplanes are certificated permit too great a take-off gross weight based on the assumption that the auto-feathering device is always going to work. In the event it does not accomplish its purpose satisfactorily, the pilot may find himself in a tight spot. Furthermore, the allowable gross weight permitted through use of the auto-feathering feature during take-off is still present. Should an engine failure occur after first and second segment climb have been completed, the auto-feathering feature is no longer a factor. But the gross weight carried out of the field, by virtue of this feature, is very much a factor in the successful clearing of obstructions and effecting a safe landing, should an engine fail during third or fourth segment climb.

Consolidated Vultee apparently has done a good job in modifying the Convair 240 to meet a specified market requirement. These were, primarily, increased range, greater payload, and greater seating capacity. They produced an airplane that met the original purchasers' desires with the possible exception of its speed. However, it was certificated by the CAA for a gross weight which exceeded the manufacturer's guaranteed minimum by 1,225 lbs.

The 340 has a good precedent to uphold in the record of the 240. Unless something develops during its use in scheduled operations, it should continue the good record of its predecessor. It is to be expected that—as has always been true with pilots—the same airplane, on the same day, will be both praised and damned by different individuals, depending upon their pet projects. Several modifications are being made already as the result of pilots' and operators' experiences during the training period. Such modifications will continue to be made until the day the aircraft disappears from the airways. This is true of all airplanes that have ever been used on schedules.

From the observations, inspections, and flight tests made while at the factory in San Diego, I think that both pilots and operators should be pleased with the new Convair 340. It would appear to be destined for a long life as a twin-engine transport. That period of economic usefulness may be extended considerably in bridging the gap between reciprocating engines and jets by the installation of turbo-jet engines.

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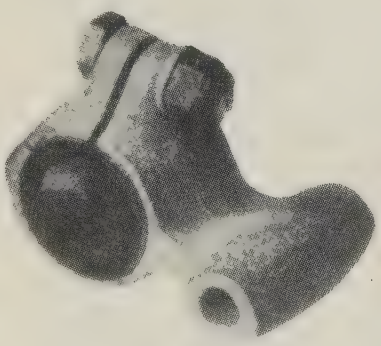

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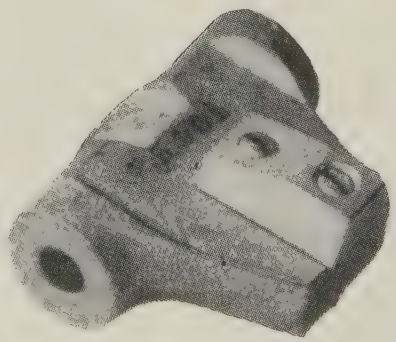

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Navigation NAVICOM Communication

Vol. 12 Number 3 March, 1953 Navicom Number 21

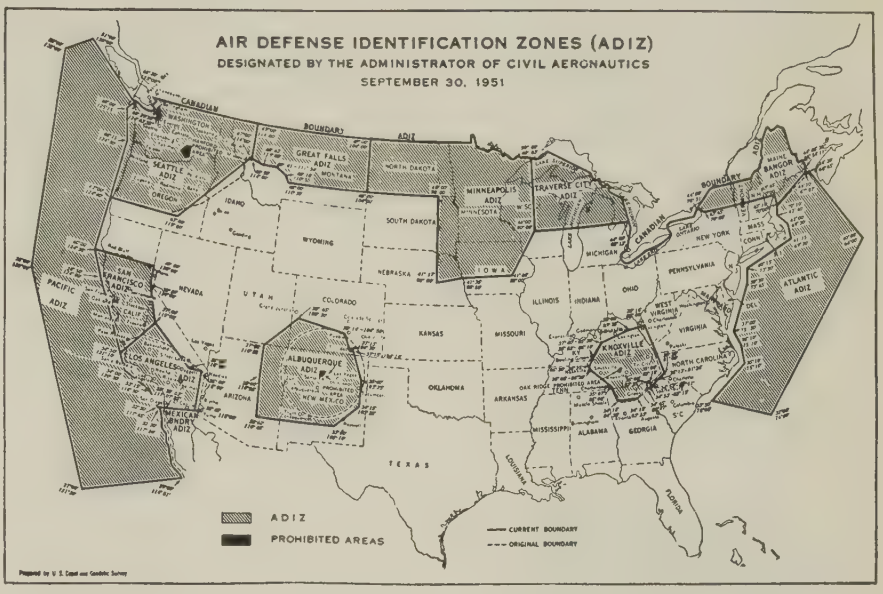
CAA Plans for Civil Air Protection in Event of Attack

One of the criticisms occasionally directed at our democratic way of life is the so-called inherent lack of combat readiness. In a world atmosphere vibrant with the threat of sudden attack, advantages of the militant totalitarianism seem attractive to people fearful of a repetition of Pearl Harbor. Much of this concern has been alleviated by the discriminating publicity given the steps taken by the Armed Forces to safeguard our approaches to, and the air over, the continental United States and Canada.

Unfortunately such information, although heartening to the non-flying public generally, has left some doubt as to the fate and disposition of the immediate operations and future of that part of the flying public who may be airborne at such a time as a part of their daily business. The scheduled air carriers, who have for some time known that they are an integral part of the national defense set-up, generally understand the part they are going to play and the circumstances which will confront them in event of a sudden strike.

The rest of the flying public, especially that part operating the clear and overwhelming majority of commercial aircraft—the corporation and business planes, are considerably concerned. They lack the close tie-in with the authorities necessary to keep them advised as to just what may happen and what will be expected of them. It undoubtedly will be comforting to know that the Armed Forces and the CAA have jointly made plans that will deny to the invader the opportunity to use our navigational and communications facilities to accomplish his purpose. That these navigational and communications facilities, therefore, will also be denied to domestic aircraft should be equally obvious, and that thought can hardly be classed as comforting.

Nevertheless, in the light of doing the best possible under such circumstances, the Armed Forces and CAA have not been remiss in planning for the protection of the flying public. It would be childish to assume that any aggressor would not anticipate and/or expect that such protective steps would be taken, and therefore it is all the more important that the flying public understand just what is likely to happen, what to do about it, and especially the urgency of the time element in reacting to the situation. It is with that purpose—that prompt and intelligent action on the part of pilots airborne at such a time is mandatory and must be assured to the Armed Forces—that this is written.



The plan of the joint agencies for Security Control of Air Traffic and Air Navigation Aids is comprehensive and simple enough to be effective if given the intelligent compliance of the flying public. The plan establishes responsibilities, procedures and general instructions for the control of civil and other non-tactical air traffic during a military emergency. It will provide maximum use of airspace for essential operations in the national defense. Likewise, it will control the availability of navigational aids and communcations facilities.

It should be obvious to any pilot that the task of distinguishing between friendly and hostile aircraft during such an emergency will be difficult enough for the Armed Forces without the additional burden of "watching" unnecessarily airborne civil aircraft. The nature of our economy is such that few companies employing aircraft will not have some relationship to the over-all defense production picture. Therefore, depending on the degree of the emergency, it is inevitable and understandable that only some responsible public agency can assume the responsibility for a rating system of flight priority based on the purpose of flight and *communications capabilities.*

Similar to the early and later days of the last war, it should be expected that there will be an orderly progression from a period of total or heavy restriction to one of comparatively light restriction as the military situation progresses. No patriotic pilot will complain if there appears to be an overdose of protective restriction at the outset of such a period. It is the declared purpose of the plan to restrict such measures to the barest minimum absolutely necessary to the active defense of the country and the fact that it has been prepared so extensively in advance should assure that there will be no just complaint of over-regulation. To a great degree, the promptness and accuracy of public cooperation will be a considerable factor in the subsequent relaxation of restrictive measures.

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Operators of localized agricultural and industrial aircraft may obtain a

(*Continued on page 63*)

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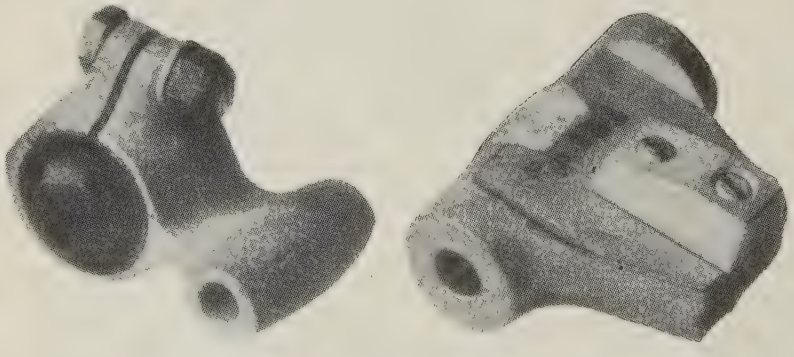

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Navigation NAVICOM Communication

Vol. 12 Number 3 March, 1953 Navicom Number 21

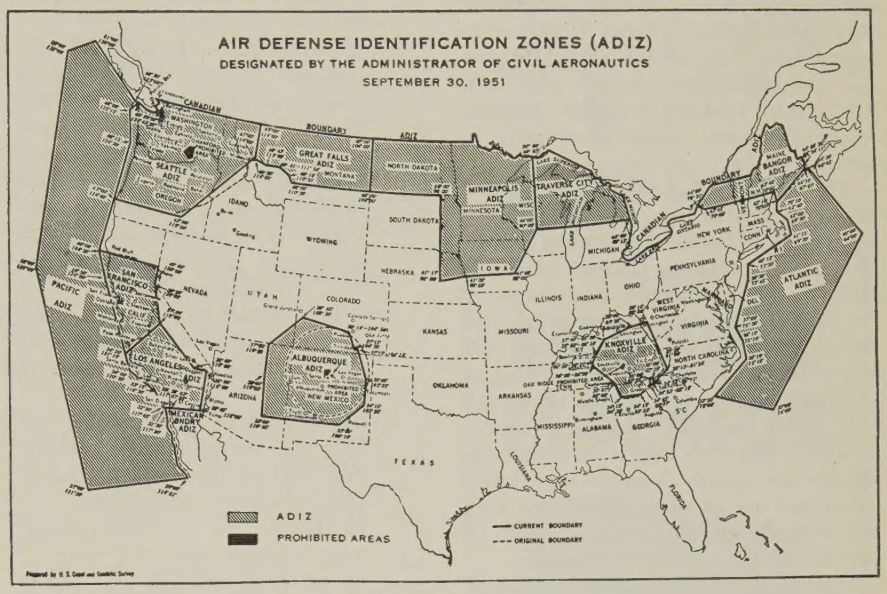
CAA Plans for Civil Air Protection in Event of Attack

One of the criticisms occasionally directed at our democratic way of life is the so-called inherent lack of combat readiness. In a world atmosphere vibrant with the threat of sudden attack, advantages of the militant totalitarianism seem attractive to people fearful of a repetition of Pearl Harbor. Much of this concern has been alleviated by the discriminating publicity given the steps taken by the Armed Forces to safeguard our approaches to, and the air over, the continental United States and Canada.

Unfortunately such information, although heartening to the non-flying public generally, has left some doubt as to the fate and disposition of the immediate operations and future of that part of the flying public who may be airborne at such a time as a part of their daily business. The scheduled air carriers, who have for some time known that they are an integral part of the national defense set-up, generally understand the part they are going to play and the circumstances which will confront them in event of a sudden strike.

The rest of the flying public, especially that part operating the clear and overwhelming majority of commercial aircraft—the corporation and business planes, are considerably concerned. They lack the close tie-in with the authorities necessary to keep them advised as to just what may happen and what will be expected of them. It undoubtedly will be comforting to know that the Armed Forces and the CAA have jointly made plans that will deny to the invader the opportunity to use our navigational and communications facilities to accomplish his purpose. That these navigational and communications facilities, therefore, will also be denied to domestic aircraft should be equally obvious, and that thought can hardly be classed as comforting.

Nevertheless, in the light of doing the best possible under such circumstances, the Armed Forces and CAA have not been remiss in planning for the protection of the flying public. It would be childish to assume that any aggressor would not anticipate and/or expect that such protective steps would be taken, and therefore it is all the more important that the flying public understand just what is likely to happen, what to do about it, and especially the urgency of the time element in reacting to the situation. It is with that purpose—that prompt and intelligent action on the part of pilots airborne at such a time is mandatory and must be assured to the Armed Forces—that this is written.



The plan of the joint agencies for Security Control of Air Traffic and Air Navigation Aids is comprehensive and simple enough to be effective if given the intelligent compliance of the flying public. The plan establishes responsibilities, procedures and general instructions for the control of civil and other non-tactical air traffic during a military emergency. It will provide maximum use of airspace for essential operations in the national defense. Likewise, it will control the availability of navigational aids and communcations facilities.

It should be obvious to any pilot that the task of distinguishing between friendly and hostile aircraft during such an emergency will be difficult enough for the Armed Forces without the additional burden of "watching" unnecessarily airborne civil aircraft. The nature of our economy is such that few companies employing aircraft will not have some relationship to the over-all defense production picture. Therefore, depending on the degree of the emergency, it is inevitable and understandable that only some responsible public agency can assume the responsibility for a rating system of flight priority based on the purpose of flight and *communications capabilities.*

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Operators of localized agricultural and industrial aircraft may obtain a

(Continued on page 63)

Atlanta Departure Control And Routings Established

Shortly after the beginning of the year, Departure Routes for all instrument flight plan departures from the Atlanta Airport were instituted. For the present, pilots may expect that, filing IFR flight plans in approximately the following cardinal compass directions, they will receive a short clearance to appropriate fixes in the general direction of their destination, with predetermined limiting altitudes designed to be attainable within the range of Atlanta Radar.

They may also expect to be queried as to the availability of the frequencies employed by Departure Control and by the Air Route Traffic Control Center to effect these procedures. Posssession of the appropriate frequencies, which will be told to the pilot when taxiing out, will result in considerable expediting of the flight's take-off. Lack of them will only result in ATC reverting to the familiar, standard long clearances and usually the equally familiar long delays (although use of these procedures with the majority of aircraft will result in expediting all aircraft normally!)

North-bound—Via the northeast course of the Atlanta low-frequency range to intersect the north course of the Atlanta VAR range (Avondale int.), then climbing on the north course of the VAR to a pre-determined altitude before turning on course.

East-bound—Via the west and east course of the Atlanta VAR range, climbing to a pre-determined altitude before turning on course.

South-bound—Via the Atlanta low-frequency range, on a track of 188° magnetic course from the low-frequency range, climbing to a predetermined altitude before turning on course.

West-bound—Via the northwest course of the Atlanta low-frequenecy range to intersect the northeast course of the Campbellton low-frequency range (Adams int.), then on a track of 290°, climbing to a pre-determined altitude before turning on course.

With reference to the above, it is understood that standard separation from all other aircraft operating or holding in the Atlanta Approach Control area will be afforded.

With respect to the west-bound departure route, however, pilots who may anticipate or encounter difficulty in making good the desired track of 290° will be offered radar guidance through vectoring from the Adams intersection, in order to insure adequate separation from the Smyrna and Campbellton holding patterns.

Air—Aids Spotlight

ATLANTA, Ga.—*Tower adding 119.5 mc, and Air Route Center adding 118.9 mc.*

BOSTON, Mass.—*Low frequency range power more than doubled, flight check indicates reception and accuracy improved on all over-land courses.*

BRADFORD, Pa.—*Power increased on this MHW radio beacon to eliminate interference from near-frequency marine markers, and other complaints.*

BROOKVILLE, Pa.—*Power also increased on this BHVT radio beacon to improve reception and navigation between Brookville and Williamsport on Red 8.*

BROWNSVILLE, Tex.—*East course of LF range swung to new heading of 247° towards station.*

CHARLOTTE, N. C.—*ILS due back in operation as construction work on southwest approach and relocation completed.*

ELMIRA, N. Y.—*Interference from London, Ont. LF range 3 kc off Elmira frequency makes course indications unreliable northwest of Mt. Morris on Red 23.*

MILWAUKEE, Wisc.—*Interesting experimental visual aid in the form of two counter-rotating beacons at the middle marker and compass locator site. Check them!*

NEW YORK AREA—LAGUARDIA—*Tower frequency 120.3 to be replaced by 125.3 mc.*

NEWARK—*Approach Control now on 126.5 mc, ("Tower" on 118.3 still) frequency previously used by NY Center on NE-bound departures over Green 5.*

NEW ROCHELLE—*ADF confusion resolved by taking old Floyd Bennett Tower LF 388 kc (FBT getting 269 kc), leaving 275 kc to Babylon.*

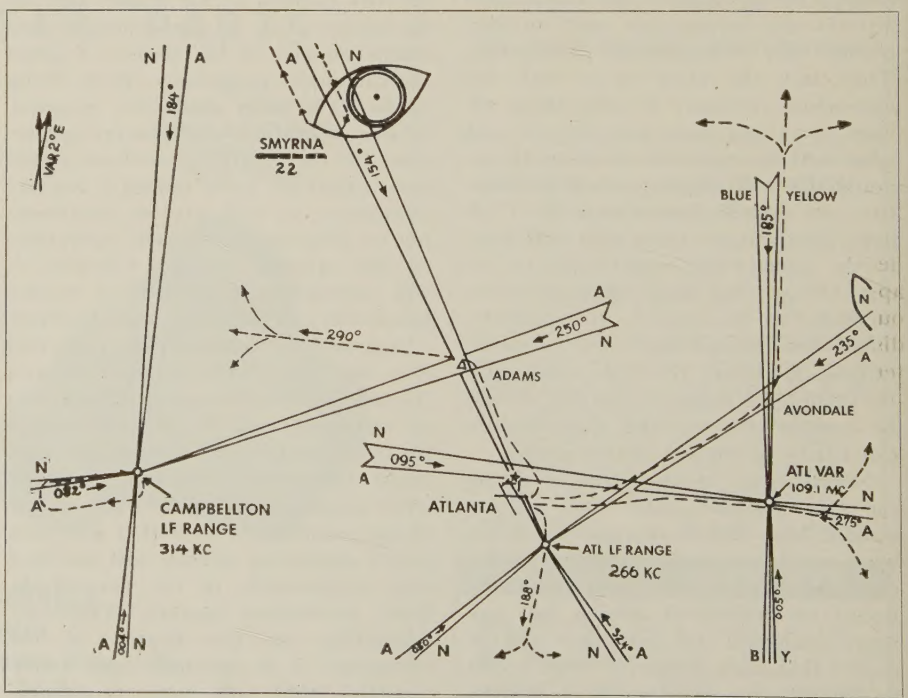
PARKERSBURG, W. Va.—*VAR replaced by the new VOR on 117.9 mc, same identification.*

PHILADELPHIA, Pa.—*"Philly" Northeast range now identifies "PNE", also on weather.*

SHREVEPORT, La.—*Greater SHV ILS Glide Path commissioned on 335 mc, altitude over Outer Marker 1400 ft. MSL, and over Middle Marker 455 ft. MSL.*

COMM. FREQ. CHANGES

BUFFALO *Tower loses 121.1, gains 120.7 mc* CINCINNATI *Center loses 120.3, gains 119.7 mc.* CLEVELAND *Center loses 120.3, gains 120.5 mc.* COLUMBUS *and* DAYTON, O. *swap frequencies, 121.1 to former, 119.5 to latter.* DETROIT *Center loses 118.9, gains 120.3 mc.* SAN ANTONIO *Center loses 120.3, gains 120.5 mc.*



ATLANTA *Departure Routings for instrument flight plan departures are indicated on this chart*

CAA Plans for Civil Air Protection in Event of Attack

(*Continued from page 61*)

waiver from compliance with the two-way radio requirement for purposes of removing their operations to a new base of operations.

Point-to-point flights outside of such ADIZ areas will operate under similar restrictions with the exception of being permitted receiver operation only if conducted in such a manner as to permit visual recall within certain prescribed time limits.

The visual signals for this purpose will be announced and may consist of highly visible color-coded smoke flares.

This White Alert condition would also automatically resume for the duration of the national emergency upon the transmission of an *All-Clear* following a condition of actual or attempted attack.

Although it is obvious that the above restrictions will not adversely affect corporation and business flying already equipped to meet them, those industrial operations affected by the radio requirements might review their equipment qualifications.

Under the above conditions, navigational and communications aids would be unaffected except for the necessity of continuous monitoring by the pilot.

Familiar to operators engaged in the last war in civil industrial or training activities will be the provision for local areas designated within an ADIZ for purpose and altitude restrictions. Although the Air Defense Commander may in certain circumstances alter the limits, they may generally be set by the CAA Regional Administrator to within 10 miles of take-off point and to altitude of not more than 2,000 feet above terrain with provision for ready recall.

It may also be necessary to divert and control all other air traffic in order that immediate employment of tactical aircraft as necessary will not be hindered. This may take the form of approved routes or corridors into and out of ADIZ's. ATC clearances may disapprove requested routings to potential target areas and suggest alternate routings and destinations for pilot consideration in the defense interest. Enroute aircraft may be given diversionary instructions as necessary.

As mentioned before, such measures will be employed only in the direst necessity and the Air Defense Commanders will be alert to relax such restrictions as rapidly as the defense interests permit.

Yellow Alert ▶ It cannot be too strongly emphasized that any violation of the afore-mentioned procedures by pilots during a White Alert condition, whether due to inadvertent error, carelessness or indifference, could bring about serious consequences, the least of which might be in-flight identification and/or the establishment of a Yellow Alert in the area, signifying the presence of unidentified aircraft. On instruments, a pilot would want to be exceptionally accurate on navigation, adhere exactly to his approved flight plan and make all required position reports in order that the flight may be identified as friendly.

During such a Yellow Alert condition, pilots could rely on the existent plan for prompt and thorough public notification of this condition via all the navigational and communications facilities he normally employs in flight. Therefore, it should be readily apparent that the continuous watch required on these frequencies is not a subject of pilot discretion. In this respect a word of caution is desirable. The easy practice of visually monitoring visual-indicating navigational aids between required position-reporting check points, without maintaining a parallel listening watch on appropriate communications channels, will be definitely out.

It is not necessary to go into a detailed description of what will happen, or be expected of a pilot during a Yellow Alert inasmuch as all such action may vary only in degree, at the discretion of the authorities, from a Red Alert condition.

Red Alert ▶ A Red Alert will very simply mean that enemy aircraft have been identified as in or approaching the affected area. Again, the individual safety of friendly airborne aircraft will depend mostly on the understanding of the pilot as to what is expected of him, his promptness and accuracy in following instructions already given him and any instructions he may receive while airborne.

It is obvious that during a Red Alert *any aircraft continuing inbound in the general direction of a probable target city or area will be considered hostile.* Aircraft proceeding outbound, or turning and proceeding outbound will be allowed to proceed to a landing within the defense area, or out of the area entirely, *provided no change of course to an inbound heading is made!*

Aircraft operating VFR will probably be instructed to turn away from specified areas, descend to minimum altitude and land as soon as practicable. Unnecessarily airborne aircraft will only complicate the military problem and may expose the pilot and passengers to great hazard. Aircraft on IFR flight plans will be specifically instructed by ATC. The enroute and crossing minimums should be firmly in the pilot's mind or immediately available.

(*Continued on page 64*)

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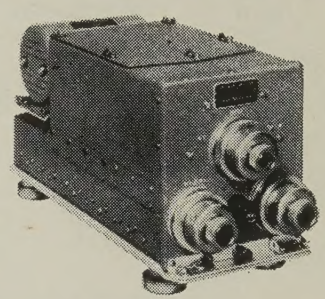

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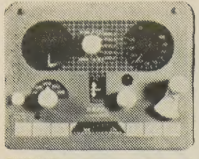

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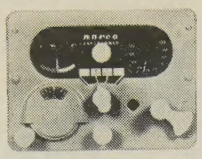

SUPERHOMER Low-cost OMNI, 4 channel VHF Transmitter and tuneable VHF Receiver. Built-in power supply. Easy to install. Weighs only 10½ pounds.

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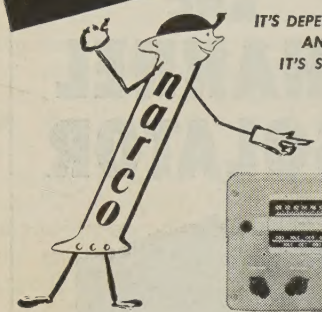

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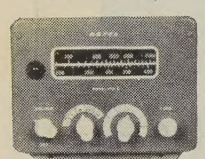

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CAA Plans for Civil Air Protection in Event of Attack

(Continued from page 63)

Procedures have been established and control personnel well versed in emergency separation techniques. Reductions in normal separation minimums have been authorized and pilots will do well to keep in mind that their efficiency and cooperation in immediate compliance will add to their safety. In any event the greater risk will be from enemy or defensive action if a pilot finds difficulty in immediate compliance with instructions. He may be assured that, insofar as the military situation will permit, the authorities have no intention of abandoning him aloft on instruments if he will follow instructions.

The obvious necessity for the shutting down of any radio facility, navigational or communication, that could be used by the enemy for his purposes, such as homing and orientation as well as track guidance, will be of concern to the airborne pilot in direct relationship to his promptness in complying with emergency instructions.

Airborne aircraft enroute to an effected area would be stopped prior to entering by appropriate broadcasts. Termination of the alert would be by announcement of a White Alert or an All Clear, again on *all* navigational and communication frequencies.

The short delay incurred by a precautionary landing to confirm clearance to proceed toward an effected areas might be good insurance. In any case, a bonafide White Alert or an All Clear would probably be accompanied by the resumption of *all* navigational facilities.

Much of the foregoing may not appear to answer many of the questions which must occur to pilot personnel of aircraft that could be caught airborne during such a situation. Naturally, in the interests of defense operations, much of the plan cannot be discussed.

It should be sufficient, however, to indicate that the respective authorities are not remiss in their responsibilities, nor that they are unaware or insensitive to the problems that will face civil pilots at such a time. Many details will undoubtedly be made available as soon as circumstances permit. Competent representatives of all phases of civil aviation have been participants in the planning. Both the good features and bad features of past experience have been examined in the light of always changing conditions.

There is good reason to hope that there will be no repetition of Pearl Harbor within the North American continent and great reliance is being placed upon the civil pilot to help assure that hope.

New Facilities Planned For Pittsburgh Area

Since the opening of the new Greater Pittsburgh Airport, the re-adjustment of navigational facilities has been fast and often. Although pointedly designed to serve the air carriers, it is inevitable that where they go, corporation and executive aircraft engaging in similar operations must follow. Hence, it is advisable that executive pilots do not ignore the changes that have already taken place, like the shifting of control and navigational frequencies, identifications, shutting down of old facilities and their replacement by newer, and often re-located facilities. Examples, of course, are the Wheeling range changeover from VAR to VOR, new or shifted radio beacons, ILS changes, etc.

Still to come is the new ILS approach at Greater Pittsburgh, which will serve the East-West runway, thereby easing the current conflict with low-altitude traffic on Green 4. Incidentally, the city fathers are having troubles acquiring the land necessary for the Hi-Intensity Approach Lights serving the same runway, so they may not be ready at the commissioning date of the ILS. Pilots are being cautioned on low-visibility approaches to not mistake the parallel taxi-strips at this airport for the runways!

As currently set-up, getting into and out of Greater PIT on IFR plan is not as easy as at old Alleghany, which might be kept in mind for future reference. Primarily, the problem is that departures have to attain their cruising altitudes before Brookville to enter Green 3, or be re-routed or delayed by inbound arrivals. Otherwise, the inbounds have to maintain an unreasonably high altitude south of Green 3 until past Butler. Equally unattractive routings that pilots may get east-bound out of PIT may be the long way around via Wheeling, busy Green 4 to New Alexandria, Red 21 to Selingsgrove, etc., which is further complicated by other enroute Green 4 traffic, PIT terminal area traffic and the afore-mentioned Greater PIT ILS approach area.

Mentioned, but not confirmed is the possibility of a new "down-the-middle" routing with the installation of a new MH radio beacon half-way between Butler and Philipsburg on or near a straight course, (possibly on the established ADF airway Red 13) providing lateral separation with both Green 3 and Green 4 until altitude separation is accomplished at the desired cruising altitude.

Definitions

Bank examiner: *Check pilot*
Booby trap: *Hungry stewardess*

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